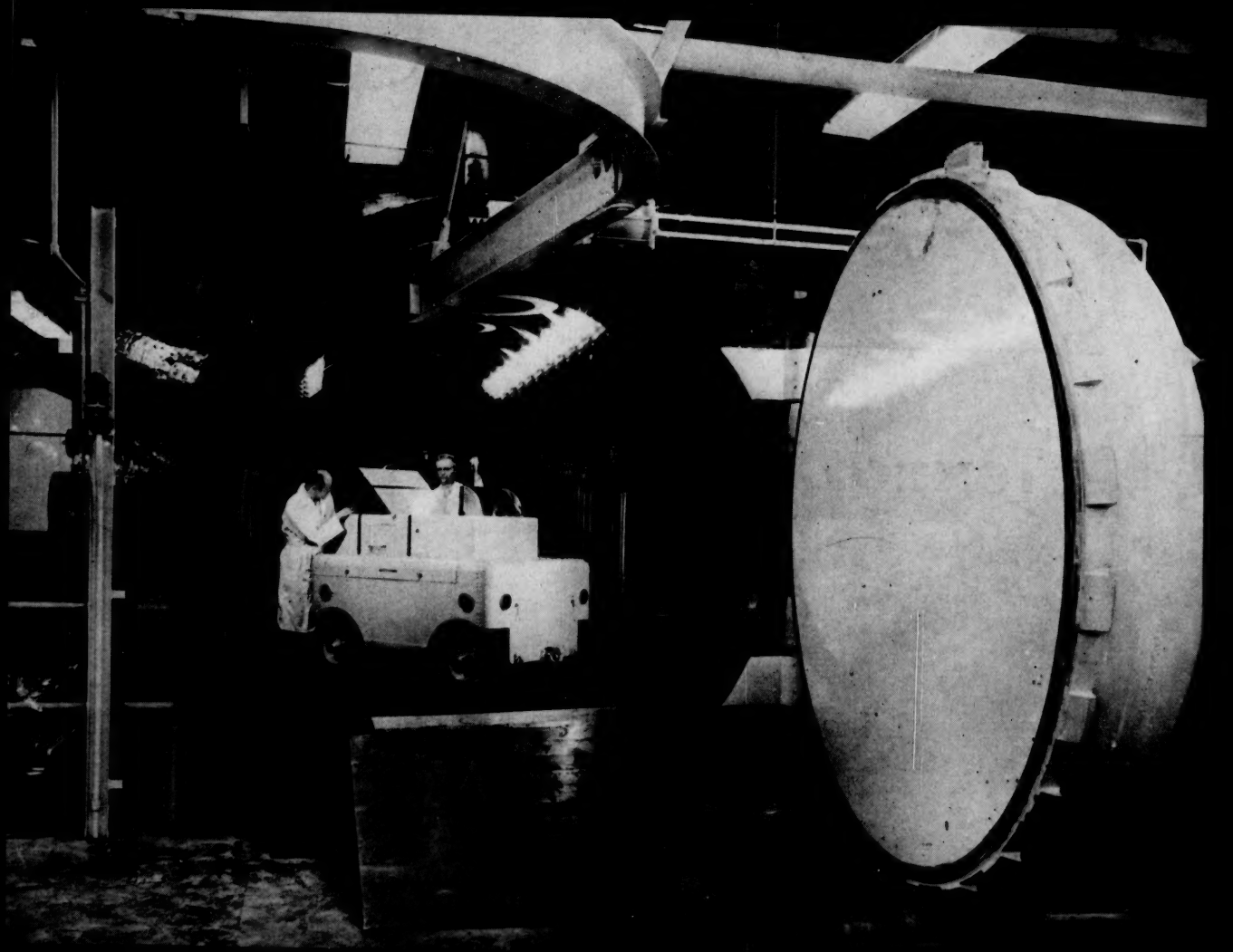
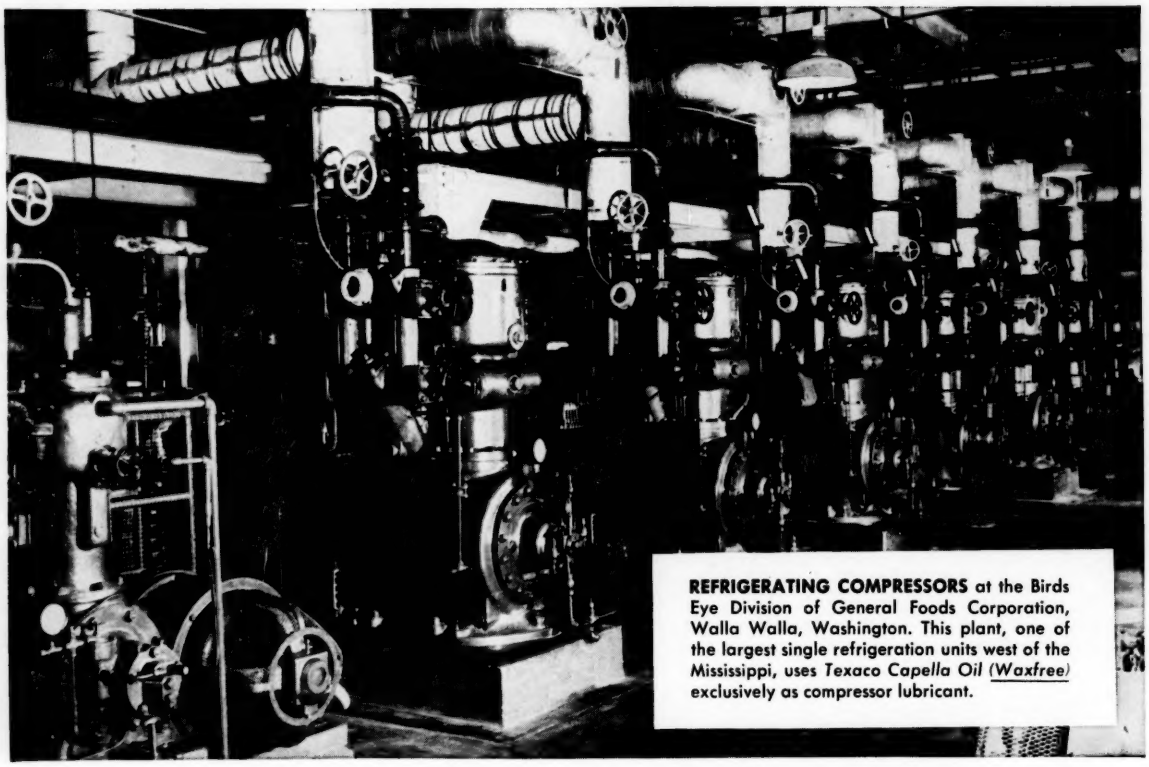
INDUSTRIAL REFRIGERATION





REFRIGERATING COMPRESSORS at the Birds Eye Division of General Foods Corporation, Walla Walla, Washington. This plant, one of the largest single refrigeration units west of the Mississippi, uses Texaco Capella Oil (Waxfree) exclusively as compressor lubricant.

Birds Eye View of Texaco Capella Oil (Waxfree)

AT the Birds Eye Division of General Foods Corporation in Walla Walla, Washington, *Texaco Capella Oil (Waxfree)* has lubricated all refrigerating compressors for years. As for the results in performance and economy, here's the report from C. C. Miller, Refrigeration Engineer:

"In a large plant like ours, dependable compressor performance is a must. Ever since we began using *Texaco Capella Oil (Waxfree)*, we've enjoyed clean, trouble-free operation, top efficiency and low maintenance costs."

Texaco Capella Oil (Waxfree) won't wax out in systems, even at temperatures as low as minus 100 degrees F. It has exceptionally low haze and floc temperatures, and is noted for its stability and high resistance to oxidation. Moreover, *Texaco Capella Oil (Waxfree)* does not foam and is compatible with all refrigerants.

There is a complete line of *Texaco Capella Oils (Waxfree)* to meet all compressor requirements. Available in 55-gallon and 5-gallon drums, 1-gallon cans—and the more popular grades in 1-quart containers.

To be sure you get the one best suited to your compressors, consult a Texaco Lubrication Engineer. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States or write:

☆ ☆ ☆

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Capella Oils (Waxfree)

FOR ALL REFRIGERATING AND AIR CONDITIONING COMPRESSORS

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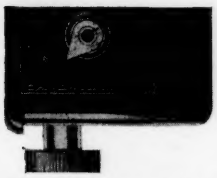
ELECTRIC Heating Cable DEFROSTERS

for LOW TEMPERATURE DOORS

1 • Temperature adjustment control.



2 • Adjustable thermostat for range of +85° to +245° F.

3 • Steel electrical outlet box for making connection between heating element and thermostat—inlet for power.

4 • Rabbeted channels into casing.

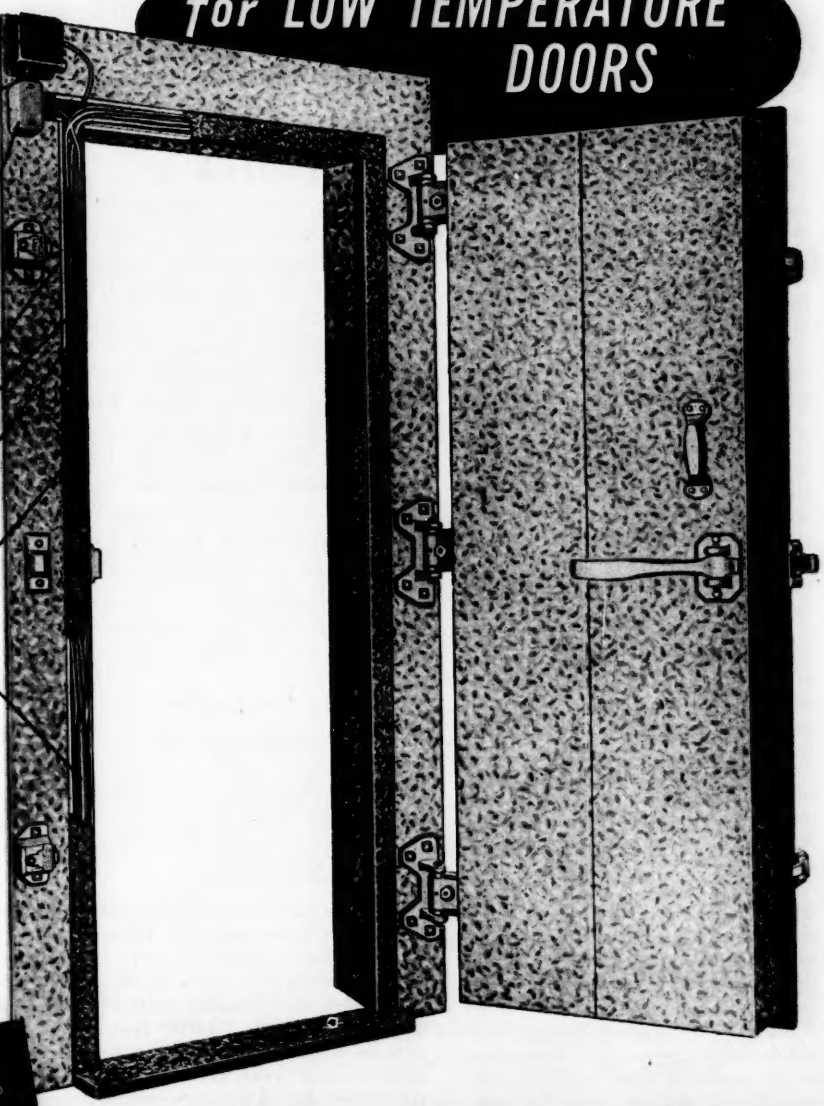
5 • Fireproof No. 26 gauge galvanized metal lined inside channel.

6 • Lead covered "heater cables" (4) held down securely by clips—approximately 20 watts to a foot. (110 volts—60 cycles).

7 • No. 10 gauge galvanized steel cover plates—removable.

8 • Capillary tube controls (on and off) thermostat.

The purpose of heating cables is to prevent icing conditions at the frame and sill areas where the door gaskets make their contact. The cables which are recessed into the frame casing are electrically heated and controlled by a "calibrated thermostat" (new improved feature by Butcher Boy), adjustable above the "dew point" of the air temperature. Since the heat expended prevents condensation it thus prevents freezing conditions.



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STAND-OUT

Shortage of Workers A Boost for Automation

ONE industrial company out of every three in the country is suffering from an acute shortage of engineers, a situation that has reached "critical national proportions," according to William C. Newberg, president of Dodge Division, Chrysler Corp. Speaking at a meeting of the Toledo Technical Council, Newberg pointed out that an anticipated increase in population will almost double the consumer demand for goods and services within the next 20 years, and that there will be "nowhere near enough" people of working age to do the job at the present rate of production.

Eliminating such far fetched solutions as a 57-hour work week, or a labor draft from the ranks of students, retired people or housewives, Newberg said the only answer left "is to find some way to get more done with fewer man hours — an engineering challenge if I ever heard one."

"It's the reason why the rapidly growing science of automation is one of the most significant and most urgently needed developments of modern engineering and management," he said.

In contrast with an acute shortage of engineers that has affected one out of every three companies, and has hampered research and development programs in nearly half of these companies, Newberg said that Soviet Russia is already turning out engineers and teachers of science and mathematics at almost double the rate this country seems to be able to do.

"In addition," he said, "30 to 40 Russian technicians are being turned out to every one we add. Regardless of the quality of these engineers and technicians, and let's not kid ourselves by underestimating even that, the threat is far from being a trivial or academic one. It's one of very real danger."

Quoting from recent published findings, Newberg told his audience that only approximately half the high schools in this country offer courses preparatory to an engineering education. He coupled this with a reported sharp drop, by as much as 56 percent, in the number of college graduates in the years 1950 through 1954 who could qualify to teach high school subjects.

The engineer of today and tomor-

(Continued on page 58)

Industrial Refrigeration

formerly **ICE AND REFRIGERATION**
Now in its 65th Year of Publication
J. F. NICKERSON, FOUNDER

Vol. 130 **May, 1956** **Number 5**

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The Cover:

This picture is a view of the altitude and cold chamber in the Airsearch Laboratory at Phoenix, Arizona. A trailer starting unit is wheeled into a giant altitude chamber for cold and hot tests. The 43 ton chamber is 15 feet in diameter, 32 feet long and encloses 4,200 cubic feet in a double shell of steel plate. Altitudes and atmospheric conditions up to 75,000 feet or 15 miles above the earth's surface can be created. Air can be supplied at the rate of 430 pounds per minute anywhere from plus 500 F to minus 70 F continuously at pressures to 15 pounds per square inch. See story on page 11.

Published Monthly by NICKERSON & COLLINS CO.
General Offices: 433 N. Waller Ave., Chicago 44, Ill. Telephones: AUstin 7-1303-04-05

H. T. McDERMOTT, EDITOR AND PUBLISHER — E. R. CURRY, MANAGING EDITOR — J. R. KELAHAN, TECHNICAL EDITOR — H. D. BUSBY, ASSOCIATE EDITOR

ADVERTISING—O. RHODIUS ELOFSON, DIRECTOR — EDW. DAVIESON, Advertising Repersentative

HELEN B. SMITH, SECRETARY — E. P. SWANSON, SUBSCRIPTION — V. S. SMITH, PRODUCTION

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INDUSTRIAL REFRIGERATION, Vol. 130, No. 5. Published monthly at 433 N. Waller Ave., Chicago, Ill., U.S.A., by Nickerson & Collins Co. Yearly subscription in the U. S., $2.00 per year; other countries, $3.00. Single copies, 25 cents.

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SPECIFY

alco solenoid valves

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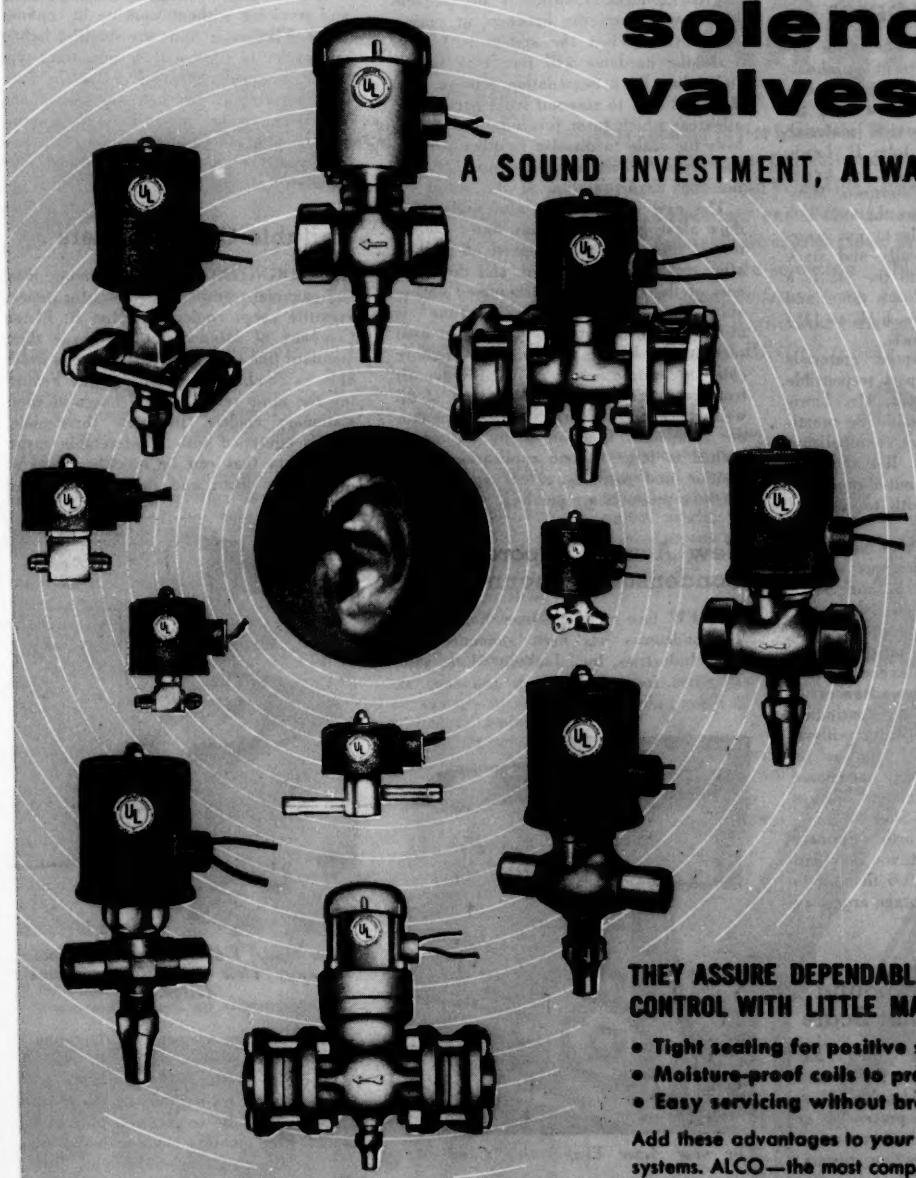

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What's New

MACHINERY
APPLIANCES • PROCESSES

Narrow Aisle Handling Equipment Saves Space

DON'T make expensive alterations and additions to your present warehouse just because you need more storage space. Not unless you've checked first with the makers of special narrow-aisle materials handling equipment, says John H. Lewis, Power Division Sales Manager for Lewis-Shepard Products, Inc., Watertown, Mass.

"The best way to get more material into undersized storage areas is to cut warehouse aisle widths drastically and stack higher. All you need to do the job is a fork truck that will turn 'on a dime' and stack ton-and-a-half loads as high as 14½ feet," according to Mr. Lewis.

Older type general-purpose materials handling equipment is in part responsible for the storage space pinch, Mr. Lewis said. "Twelve-foot aisles should be practically obsolete today. They're cannibalizing perfectly good floor space. But they are still very common because out-of-date fork trucks need that much width to stack at right angles," he explained.

Lewis-Shepard points out that many companies have realized tremendous savings by switching from 12- to 8- and 6-foot aisles through use of narrow-aisle equipment. Often, reclaimed space has been freed for other-than-storage purposes by a plant that needed room to expand. Every industry has benefited from advances in warehousing made possible by continuing progress in reducing aisle width without sacrificing ease of handling, it was revealed. It doesn't take a large warehouse to mean big space and money savings either, according to Lewis-Shepard engineers. With floor space worth anywhere from $5 to $10 a square foot, you may find as much as $25,000 to $40,000 tied up in waste space, though your storage area may measure only 100 x 100 feet.

New Chemical Compound Removes Hard Water Scale

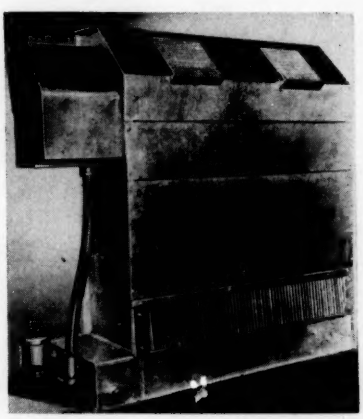
ANOTHER new product called "Ke-Tone", manufactured by the United Chemical Corporation of Hobbs, New Mexico, is now available for the prevention or removal of hard water scale build-up on or in valves, pipes, tanks, cooling towers, evaporators, boilers, heat exchangers, etc. (Feb. 1955, IR, Page 48, carried item on similar products). The "Ke-Tone" method of treating large quantities of water is said to be both effective and economical. It was developed as a result of recent advances in the fields of chelate and surface chemistry.

As used in actual practice, this compound is added to water at the rate of 1 lb. to 200,000 grains of contained water hardness or from 3 to 5 ppm, whichever gives the highest concentration of treating agent. A daily check on the water in the system shows a gradual but continuous rise in its hardness. Continuous or frequent blow-downs keep the hardness at reasonable levels. When the system is free of scale the hardness will return to its initial value. By a degradation process, "Ke-Tone" is said to suspend scale particles in all areas which favor precipitation, and allows the scale to dissolve in other parts of the system where solubility product relationships favor solution of the scale.

The new compound is also said to reduce algae growth. In many water cooling towers these growths sloughed off rapidly after treatment was started, and the hardness of the treated water increased noticeably. Manufacturers claim "Ke-Tone" is already a proven product. It was first used successfully by oil producers to remove calcium sulfate and carbonate deposit from pumping valves at the bottom of oil wells. However, the principle which makes the compound function is by no means limited to large volume application. Composition and methods patent applications on these products are pending.

New Acme Evaporative Condensers Announced

A NEW line of Flow-Mizer Evaporative Condensers has been announced by Acme Industries, Inc., Jackson, Mich. with capacities from 20 through 150 tons at 75 F wet bulb.



The new Acme Evaporative Condenser

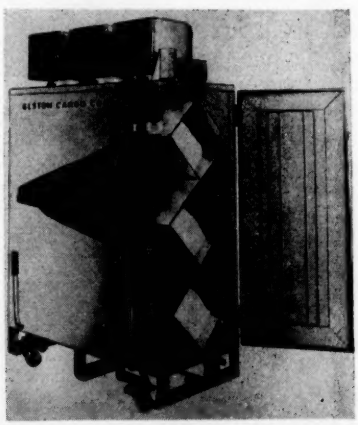
An advanced design blower section has air outlets on a 45° angle that allow any direction of air discharge. The construction allows economical installation of ducts, when required, with centrifugal blowers furnishing ample power to offset ductwork static pressures.

Another feature is a new, simplified external sump that simplifies water treatment, servicing of sediment screen and draining of the unit. Immediately accessible when the sump lid is lifted is a patented, combination bleed-off, drain and overflow stand-pipe. Stand-pipe prevents accidental overflow and slips out of drain connection for quick, easy draining of sump water during cold weather shutdowns.

Full access to the drift eliminators, nozzles and condenser tubes is made possible in the new design. Removable full-width side panels make for easy inspection and servicing without working in confined space. Eliminator units are smaller, lighter and easier to slide out. A new, track-type motor mounting provides a simple four-way adjustment for belt tightening and pulley alignment. Streamlined in appearance, a new combination motor cover and belt guard is also easy to remove and replace.

Portable Cargo Coolers

RECOGNIZING the need among commercial transport operators for a more versatile cargo cooler, the Rue R. Elston Company of Minneapolis has made their standard line of dry ice cargo coolers available as completely portable units. Featuring the same revolutionary design as their stationary coolers, the new three-model line is equipped with a retractable caster mechanism that can be quickly raised or lowered by hand and the cooler in and



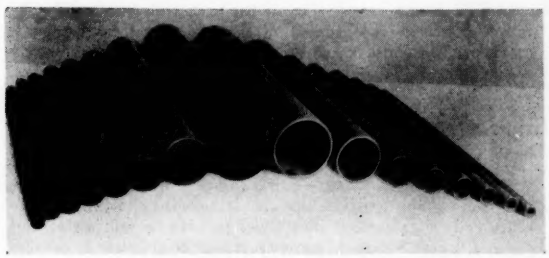
Elston Model P-600 dry ice cargo cooler. Cut away view shows unique bunker design.

out of the trailer whenever refrigeration is needed. The operator need only roll the unit into the trailer, lift the wheels, hook the unit to the trailer wall by the bracket furnished with the cooler, and plug in the current. Free mobility enables the operator to utilize the cooler throughout his fleet.

Three models are available. Model P-300 is designed for truck bodies 18 ft or less and has a dry ice storage capacity of 300 lbs. Models P-450 and P-600 are designed for trailer equipment. Storage capacities are 450 and 60 lbs. respectively. Cooling rate for each model is 450 cu. ft. per min. per fan. The coolers can be mounted to suit the operator's convenience, can be manually or thermostatically controlled. Optional equipment includes a standby control cabinet, thermometer and temperature controls. Special units can be custom-built to specifications.

Plastic Pipe Marketed

RIGID unplasticized PVC (polyvinyl chloride) pipe is now being marketed by The Alloy Tube Division of the Carpenter Steel Co. Union, N. J. These represent the first non-metallic products ever supplied by the Division, which has been producing a wide range of stainless steel tubing and pipe for over 28 years. The new plastic line is being made available through present Carpenter distributors from coast to coast.



New Carpenter PVC plastic pipe in various sizes.

The Division is offering two types of PVC, a normal impact grade with high chemical resistance, and a high impact grade with slightly less chemical resistance but much greater strength. They are designated Carpenter PVC No. 1 and Carpenter PVC No. 2, respectively. Threaded and socket types of fittings are available.

Both types of PVC are easily fabricated on standard metal and woodworking equipment. They can be formed, sawed, threaded, machined, hot gas welded and solvent cemented. Installation is simple and inexpensive.

The materials are only one-half the weight of aluminum, and one-sixth the weight of steel. Aging characteristics are said to be outstanding. Both types are said to be non-toxic, odorless, tasteless, non-porous, non-contaminating, abrasion resistant and non-flammable. Friction loss is about one-half that of steel. Both are non-electrolytic and make excellent electrical insulating materials.

PVC pipe is available in Schedules 40 and 80 in nominal sizes ranging from ½ to 4 inches. All pipe is furnished in standard 10 and 20 foot lengths with plain ends.

Tube Expander Drive

A NEW tube expander drive called the Torq-Air-Matic, has been developed by Thomas C. Wilson, Inc., Long Island City, New York. According to the manufacturer, it is the first all-air driven tube expander drive, the first to offer a control entirely free from the affect of operating variables and maintenance problems, and the first to provide a control with torque out-put calibrated in terms of foot-pounds instead of arbitrary units of measurement.

Measuring devices on conventional expander controls measure

The Torq-Air-Matic, new tube expander drive developed by Thomas C. Wilson, Inc.

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Easy-reading Taylor Industrial Thermometers invite frequent readings for better protection of your equipment.
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Oblique angle (150°) designed for easy reading below eye level. Range minus 40° to +110°F.

For small diameter brine or ammonia lines
½" fixed thread connection. Stem extends 1" below the thread. Range minus 20° to +120°F.

There's a Taylor Thermometer for practically every temperature measuring problem. Ask your Taylor Field Engineer, or write for **Catalog 300.** Taylor Instrument Companies, Rochester. N. Y., and Toronto, Canada.

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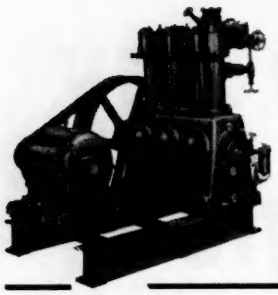
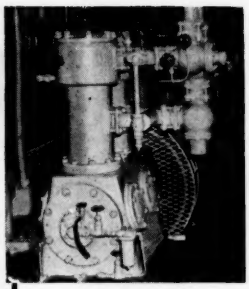
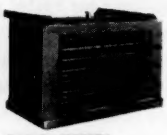


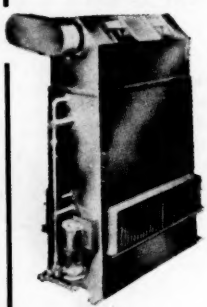
MODEL D IN SIZES
from 25 to 150-ton capacity



HOWE BOOSTER COMPRESSORS
For low temperature service.



RAPID FREEZE UNIT COOLER
Designed for blast and freezer storage



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10 ton to 200 ton capacity

THERE IS A

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FOR EVERY SIZE LOAD AND APPLICATION

THREE generations of Howe engineers have been helping the plant owner, design and operating engineer solve their refrigeration problems. The "know-Howe" behind the design and application of Howe equipment is geared directly to efficient refrigeration installations. Hundreds of repeat orders prove *it pays to know Howe!* Our engineers will gladly make recommendations . . . no obligation, of course.

WRITE FOR LITERATURE

Since 1912, manufacturers of ammonia compressors, condensers, coolers, fin coils, locker freezing units, air conditioning (cooling) equipment.

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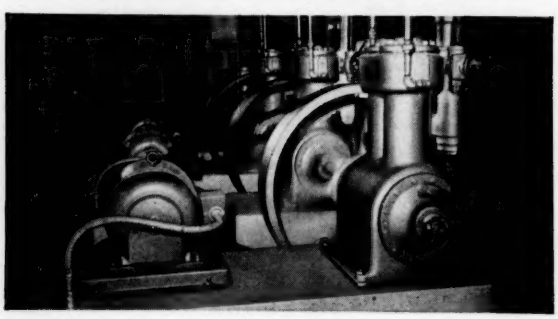
MODEL G — 5 TONS TO 25 TONS CAPACITY

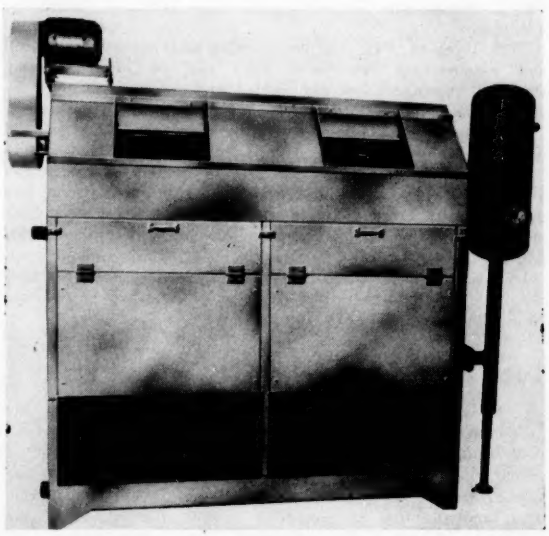


input output ratio only. The Torq-Air-Matic method of registering torque at the output spindle prevents tubes from being over-rolled or under-rolled. The readings are precise and consistent regardless of tube sheet hole variations. This control feature also eliminates overstressing of tube sheets, reduces warpage and ligament "push-over." Tube bowing is held to minimum which increases the efficiency of heat exchange units. Tube life is increased and operator fatigue is minimized, it is claimed.

The basic unit is of the pistol-grip design and is furnished with an auxiliary handle that may be swivelled to any position desired by the operator. Oil reservoir has been built into the handle. Control section is independent of the motor and lubrication is permanent. The chuck snaps on. The total weight with the auxiliary handle is approximately 7½ lbs and the length is 10 inches.

Imeco Space Cooler

THE IMECO floor type space cooler, introduced by Industrial Manufacturing & Engineering Company, Chicago, Ill., is designed for cooling and chilling air. It consists of a finned type cooling coil, a galvanized sheet steel housing, a fan, motor and drive and, where required, surge drum with float valve. It delivers a large volume of refrigerated air where required and can be used for holding food products at desired temperatures, for chilling food products to the desired temperature and for freezing food products. It is used in meat packing plants, cold storage warehouses and wherever perishable food such as poultry, dairy products, fish, etc., and stored, processed or frozen.



Floor type dry coil Imeco space cooler.

It is made in eight different sizes ranging from 2210 Btus to 14,760 Btus per degree temperature difference and from 3610 cfm to 19,600 cfm. Available with galvanized sheet iron casing treated with a rust resistant paint or completely hot dip galvanized. Water defrost arrangement, surge drums and float valves optional equipment. Can also be arranged for thermal valve feed or brine circulation.

Coil is made of 1 inch O.D. condenser tubing with plate fins, hot dip galvanized after fabrication. Available in three fins per inch, four fins per inch and six fins per inch to fit various suction temperature.

Of sturdy construction, the Imeco floor type space cooler is built for heavy duty operation. The casing is made up in three parts—the pan section, the coil section and the fan section. This design permits a variety of arrangements in the unit makeup. The air inlet, access doors and piping connections may be changed readily in the field. Pan is reinforced with galvanized structural angles, coil section is of panel construction and side panels are readily removable to give access to entire coil. Water defrost units are provided with large access doors for inspection of coil and easy access to spray nozzles.

Jenni Genetron says:

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IT'S ALWAYS THE RIGHT TIME FOR genetron® Super-Dry Refrigerants

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Basic Chemicals for American Industry

GENERAL CHEMICAL DIVISION
ALLIED CHEMICAL & DYE CORPORATION
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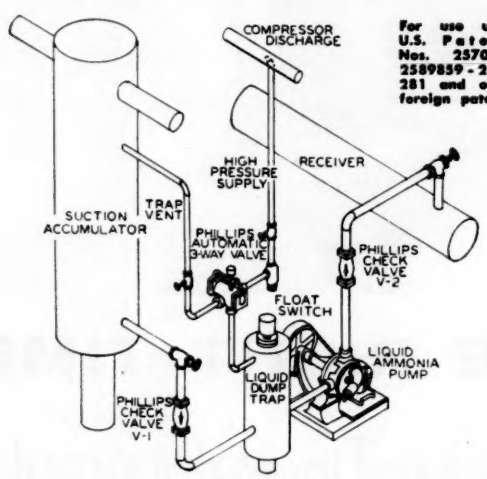
GC Allied Chemical

Ammonia "Slop-Over" Handled Automatically by PHILLIPS Liquid Return System

Protects Compressors, Saves Power, Makes Defrosting and Maintenance Simpler

Even in the best designed refrigeration systems, ammonia "slop-over" is a common occurrence. Two stage compression systems, booster systems and control ammonia compression systems subject to fast temperature and pressure changes are especially likely to have liquid in suction lines. This condition can seriously damage compressors which should handle dry gasses only.

Engineers at H. A. Phillips & Co. have devised a system that automatically returns "slop-over" directly to the receiver without regenerating and re-condensing the liquid. As shown in the drawing below, the Phillips Liquid Return System takes liquid ammonia which has collected in the accumulator, drains it through an outlet valve and check valve (V-1) into a liquid trap. Drainage occurs when the trap is at a low pressure. The trap is vented to the accumulator through a three-way valve and vent line. As the trap fills, a float switch is activated, energizing a three-way valve. This valve closes the vent line and connects the compressor discharge to the trap. Pressure builds up in the trap and closes check valve V-1. Pressure in the trap then reaches the same pressure as the receiver, opening check valve V-2 and allowing gravity to carry the liquid to the receiver. If gravity flow is not possible, a liquid ammonia pump is used. High pressure at both the pump inlet and outlet prevents flashing the liquid into gas. When the liquid trap is empty, the three-way valve is de-energized, closing the high pressure line to the trap. The trap is again vented to the accumulator, allowing liquid to drain once again into the trap.



For use under U.S. Patents Nos. 2570979-2589839-2641-281 and other foreign patents.

Phillips Liquid Return System

This arrangement is highly efficient since only one pound of compression gas is required to move 25 pounds of liquid. There is practically no loss of refrigeration potential of the recovered liquid. The system also permits oil flushed into the accumulator to be easily drained.

A number of "packaged" variations of this system in capacities to 1000-tons are available to handle all arrangements of accumulator and receiver locations. For full details, write . . .

PHILLIPS

H. A. PHILLIPS & CO.

DESIGNERS AND ENGINEERS REFRIGERATION CONTROL SYSTEMS

3255 W. Carroll Ave. • Chicago 24, Illinois

PRESS BRIEFS

Pipeline Service to New York Wholesalers May Be Discontinued

THE MERCHANTS Refrigerating Company, which supplies refrigeration service to butter and egg wholesalers in New York City has warned that it may have to cut off service unless it can reach easier terms in its contractual obligations with the city. The company maintains a chill manufacturing plant at 17-37 N. Moore St. From there, chilled brine is pumped through underground pipelines to most of the dealers' warehouses in an area bounded by Hubert St., on the north and Warren St., on the south end — all between West Broadway and the river. It is estimated that about 200 warehouses are on the system.

In a letter to its customers Merchants outlined conditions of the city franchise. It is required to maintain the pipeline; rebuild or reconstruct the line in case of damage; protect or move the lines should they interfere with the construction or maintenance of public works; relocate conduits interfering with new structures; and extend additional pipelines to premises located within or abutting on the franchise area.

Nils R. Bernz, vice president and director of engineering, informed the wholesalers "the burden of these requirements, in the light of existing conditions, can no longer be carried by Merchants. Portions of the pipelines are over 40 years old, and it is a matter of conjecture as to just how much longer they can be maintained without extensive and costly reconstruction. To agree to restore or reconstruct the pipeline at its present age would be tantamount to agreeing to install a new pipeline. This, in the light of a changing neighborhood, and a declining pipeline use, no prudent businessman would consider."

Mr. Bernz said that Merchants is willing to enter into a new franchise agreement with the city provided the new terms impose no liabilities other than ordinary repairs to the line. Without this, and several other major concessions by the city, the firm says the service will be discontinued.

Without the piped-in service, wholesalers would have to install costly refrigeration machinery. Many of the buildings are old, and dealers say that if they have to take on this expense, they'd prefer to erect new buildings elsewhere. To complicate matters, many wholesalers are only tenants, and it is doubtful if landlords would assist in installing the equipment.

More Refrigerator Cars

CERTIFICATES of necessity for accelerated tax amortization on refrigerated cars for three transportation companies, amounting to nearly $4 million dollars, were issued by the Office of Defense Mobilization in early March. North American Car Corporation of Chicago was listed by Executive Office of the President as undertaking a million dollars worth of refrigerator car construction. At St. Paul, Minnesota, the Northern Pacific Railway Company indicated in its application that it intends investment of over two and a quarter million dollars in new refrigerator equipment, and the American Refrigerator Transit Company of St. Louis has issued a certificate covering the investment of $625,000. The ODM announcement did not indicate the number of railroad cars involved.

Refrigeration Extends Storage Life of Milk in Plastic Bottles

A NEW 6-gallon "bottle" to haul milk products long distance is expected to save farmers a lot of money each year, according to news reports.

The "bottle" which is a plastic sack inside a cardboard carton was developed by the Producers Creamery Company, Springfield, Mo. The co-op is an affiliate of Missouri Farmers Association.

The co-op's new square container will cost 36c, weigh two pounds, and be thrown away after it's used once. Milk plants will ship condensed milk, cream, ice cream mix, and cottage cheese in the new bottles. It is not designed for any farm-to-factory or consumer use.

Compared with the old 10-gallon milk can which costs $9.50 and weighs 26 pounds, the new "bottle" it is claimed is revolutionary. A fully-loaded semi-trailer will carry 30% more cream in the new packages.

Cans need to be washed, repaired, retinned, stored, hauled back empty. To do this a firm needs labor, trucks, cleaning equipment, conveyors, space, record keepers. The "bottles" eliminate all this.

Normal refrigerated storage life of cream in clean metal cans is 10-12 days. In the "bottles", cream will last 18 days under refrigeration. When a buyer empties a can, half a pound of cream sticks to the sides. In the polyethylene sack, only one-fourth as much remains.

The co-op will license its "bottle" to other shippers, and royalties will go to co-op members. The co-op's technical director, Burdet Heinemann, spent five years developing the new container, and it has already met strenuous tests on long hauls.

St. Louis Storage Burned

FIRE thought to have been of incendiary origin caused damage estimated at $10,000 at a storage warehouse of the City Products Corp. at 6801 Hoffman Avenue, St. Louis. Four alarms were sounded before the flames were brought under control. A former ice storage plant, the 50-foot-high, windowless brick structure contained about 2500 cattle hides in the process of curing. The flames, which were confined to a sawdust-filled space between a false ceiling and the roof, did no damage to the hides but water damage was put at about $1000.

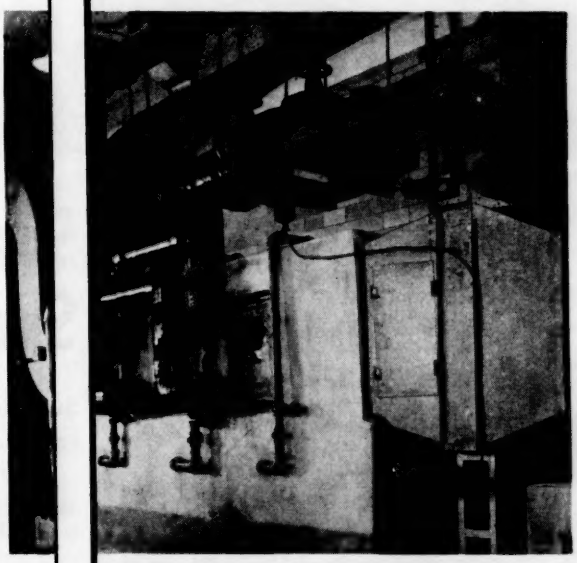
Because of reports that neighborhood children had been seen on the roof at frequent intervals, the police arson squad was investigating to determine whether the fire could have been started by some of them. Seven firemen were on ladders or on a fire escape when a crack in the wall prompted Chief Lyon to call the men down and attack the fire with turrret-mounted hoses that sent streams of water high onto the blazing roof. Heavy smoke attracted many spectators.

New Tulsa Warehouse

A NEW frozen food warehouse is planned for construction in May at Tulsa, Okla., by a new firm known as The Wade Corporation, formed by eight Tulsa business men. The 64,000 square foot warehouse will cost an estimated $1,250,000. It will contain space for storage, individual offices for frozen food brokers and general warehouse offices.

Building features include inside docks for unloading 10 freight cars and 12 trucks and a freezing section holding 1,300,000 pounds of frozen food merchandise. The warehouse will serve as a distribution center for all types of frozen foods, with processors, guaranteeing to lease specified space in the upcoming structure.

GENUINE
OZITE
PIPE COVERING
INSULATION



CUTS POWER CONSUMPTION

- APPLIES EASILY WITHOUT WASTE
- LOW CONDUCTIVITY FOR EFFICIENT HEAT BARRIER
- ALLOWS CLOSE TEMPERATURE CONTROL
- LASTS A LIFETIME

OZITE All-Hair felt is easy to install for curves, straight pipes or valves... applies without waste ...provides maximum capacity of refrigeration units... Ozite is practically indestructible.

Write for Bulletin No. 300

No shape is too complex

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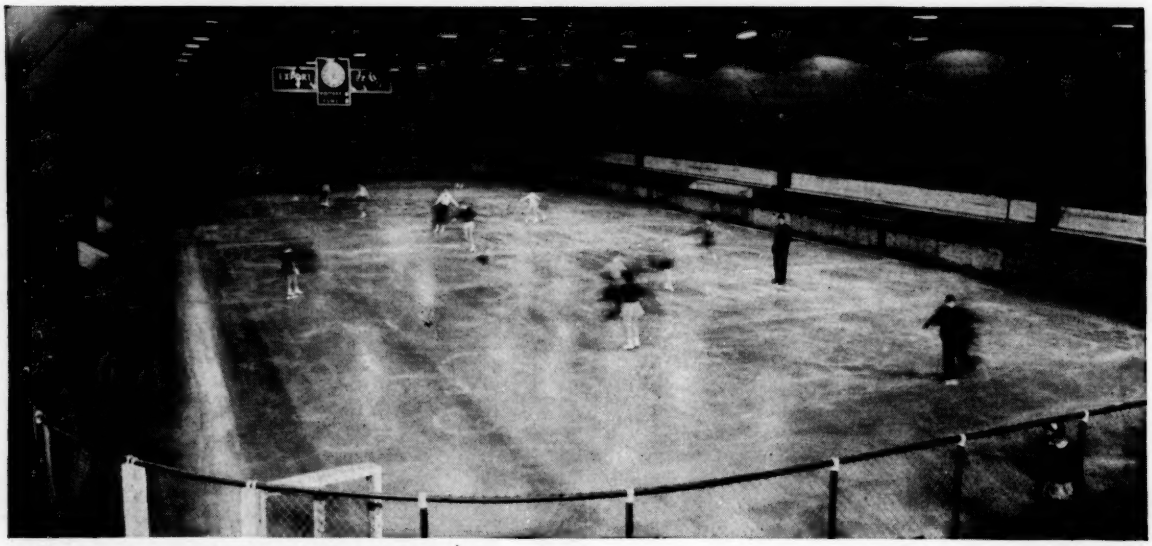
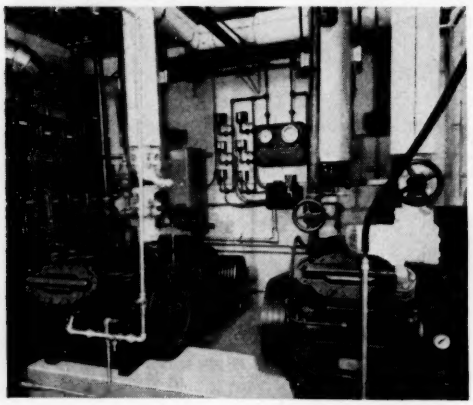


HARD ICE even in the middle of the summer brings skaters all-year-'round to Sundridge Arena. Ice surface measures 175' x 75'. Walls and ceiling of Arena are insulated to reduce heat load from sun.



ECONOMICAL OPERATION of these two CP Type "K" Multi-Cylinder Compressors in refrigeration system at Community Memorial Arena make all-year skating both practical and profitable.

PUSH BUTTON CONTROL of refrigeration system simplifies operation and maintenance. CP can design an automatically controlled refrigeration system that will fit your job and budget.

Summertime Outside—Skating Inside

Sundridge Arena Expands CP Refrigeration System for Year-'Round Skating

Skating and curling no longer have to be restricted to winter months! It's both practical and economical to operate a rink all-year around!

Last fall, Community Memorial Arena of Sundridge, Ontario, installed a CP refrigeration system to insure hard, smooth ice for winter skating, uninterrupted by unseasonable warm spells. The system consisted of a six cylinder 3½ x 3½ Type "K" Multi-Cylinder Compressor and all controls to make it completely automatic.

This spring, *after the efficiency and automatic operation had been proved by actual performance*, Sundridge again contacted CP, this time to expand the refrigeration system for summer skating. A four cylinder 3½ x 3½ Type "K" Multi-Cylinder Compressor driven by a 30 HP motor was added together with automatic controls. The system has been in continuous operation since June 17.

Now, Sundridge is able to offer Toronto enthusiasts all-year skating while making full use of facilities that otherwise would be idle during warm weather.

CP Refrigeration can make your rink more productive—whether you want to insure top condition ice for the winter season or make skating and curling an all-season sport in your community. A CP refrigeration system is economical to install, easy to operate and maintain. It is designed by CP engineers to fit your job exactly for lowest initial and operating costs. Write on your letterhead for full details. No obligation, of course.

THE *Creamery Package* MFG. COMPANY
GENERAL AND EXPORT OFFICES:
1243 W. WASHINGTON BLVD., CHICAGO 7, ILL.

In the Spotlight

SERVICE To the membership appeared to be the theme of the annual meeting of the American Warehousemen's association, and the National Association of Refrigerated warehouses, held in Los Angeles in April. Committees and administration staffs all put forth their best efforts to help members with sales, operations, construction, engineering, labor, legislation, taxes, safety, and insurance problems. Attendance at business sessions often involved standing room only. Report starts on page 17.

The annual meeting of the Refrigeration Research Foundation was held in connection. Progress of the last twelve years was reviewed and future research work was outlined. See page 24.

THE RADIATION preservation of foods founded on the anticipated military needs of the future is a major subject of research in the program of the Quartermaster Food and Container Institute of the Armed Forces, Chicago. An Open House observance of the Twentieth Anniversary of the Institute was held March 13. At this meeting, progress in atomic radiation was outlined and future plans were sketched to reduce deterioration and spoilage of foods during handling and storage. For these and other developments, see story on page 13.

A STANDARD for identification of piping systems sponsored by The National Safety Council and The American Society of Mechanical Engineers has been issued by The American Standards Association. For purpose of identification, fittings, valves and pipe coverings are included. See page 28 for full description and classification colors.

THE NEW refrigerated warehouse of Quincy Market Cold Storage & Warehouse Company of Boston at Gloucester, Mass., is a good example of modern warehouse construction. For description and pictures see page 29.

AIR CONDITIONING for livestock is attracting the attention of engineers and farmers following experiments on the subject at the University of Missouri. Here it was found that where air conditioning was used to cool their living quarters, both livestock and poultry showed gains. See page 32.

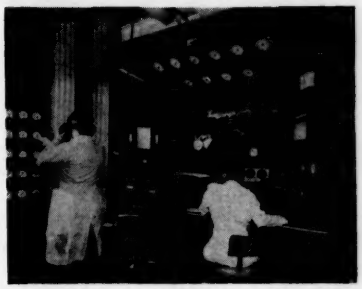
FACILITIES for testing refrigeration and air conditioning equipment at Underwriter's Laboratories, Inc., Chicago, are two years old. To acquaint members with this non-profit organization's work in this field, Chicago Chapter, NAPRE, arranged a tour of the Lab on January 24. A description of the equipment inspected appears on page 33.

FROZEN FOOD packers look for a big increased demand in 1956, about 15 percent above the 1955 volume according to L. S. Martin, secretary manager of The National Association of Frozen Food Packers. For a summary of Mr. Martin's comments see article on page 56.

CARBON DIOXIDE soon may be used to make safer X-ray examinations of human hearts. Doctors at Temple University Medical School, Philadelphia, suggested CO_2 to be used to make heart chambers opaque to X-rays because it is more soluble in blood than air or oxygen and, therefore, less likely to plug blood vessels.

FUR STORAGE, which requires controlled temperatures and humidities, has led to similar storage for other winter garments for which special boxes were designed. This service provides preservation, and also relieves the home of crowded closet space during the summer. The story of this business, developed not so many years ago, is told in the article on page 31.

Refrigeration Makes Climate for Tests



***LARGE** tonnage refrigeration equipment is finding ever widening application in all phases of research activity, especially in creating climatic conditions which are likely to be found anywhere in the world and high in the atmosphere.*

Serving industry and the national defense requirements in determining accurately how well equipment will withstand the severest fatigue tests, is the task of cold and altitude chambers such as pictured on the front cover installation at the AiResearch Manufacturing Co., Phoenix, Arizona.

Shown in the cover picture is a trailer starting unit in which altitudes up to fifteen miles above the earth's surface can be created. This control panel for the giant 43-ton altitude and cold chamber is monitored by two lab technicians. Viewing the equipment being tested through a special six-slab laminated glass window, the technicians record all reactions of equipment up to 75,000 feet or while climbing or diving from any pre-selected level to any other level in that range in one minute's time at minus 70 F.

Products which can be mass production tested are gas turbine engines, air turbines, air turbine starters, pneumatic controls, cabin pressure regulators, valves, refrigeration turbines, heat transfer equipment, and similar products as well as complete systems employing these components.

"Mogul Kwik-Kleen does amazing job, removing 96% scale from sweet water cooler." Minnesota

"Mogul Kwik-Kleen solves vexing scale problem in 2 - 1000 ton refrigeration condensers and 2 - 1000 ton surface condensers." Texas

"Remarkable cleaning job in induced draft cooling tower, serving 4 air conditioning systems — 50% saving in time, 50% saving in cost." Tennessee

"99.9% scale removed from absorption type water chiller in air conditioning system." Alabama

"Wood flour and scale successfully removed with Mogul Kwik-Kleen from 100 ton evaporative condenser." Indiana

"Special high temperature generator cleaned by Mogul Kwik-Kleen with results beyond all expectations." New Jersey

"Large air compressor descaled in 7 hours. Former manual cleaning required 2 men 4 days." Connecticut

reports are pouring in....

ABOUT THE SENSATIONAL RESULTS OF SCALE REMOVAL WITH THE NEW

MOGUL KWIK-KLEEN

From all sections of the country come case histories of the speed, efficiency and savings in cost, when MOGUL KWIK-KLEEN is used. MOGUL KWIK-KLEEN does a rapid scale removal job and is completely SAFE to use. It is non-corrosive and does not attack metal, valves, gaskets, packing or paint. Neither does it harm the skin of persons using it, nor their clothing and shoes.

MOGUL KWIK-KLEEN does not create undesirable odors or dangerous toxic fumes. No special skill or ability is required for its use.

MOGUL SERVICE . . .Covers fact finding surveys, periodic inspection, consulting service, water analyses and recommended water treatment, for any equipment in your plant. Performance guaranteed.

Write today and tell us about your scale problem.

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Our Scale Problem is:

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40 YEARS OF PROGRESS . . . AND STILL GROWING

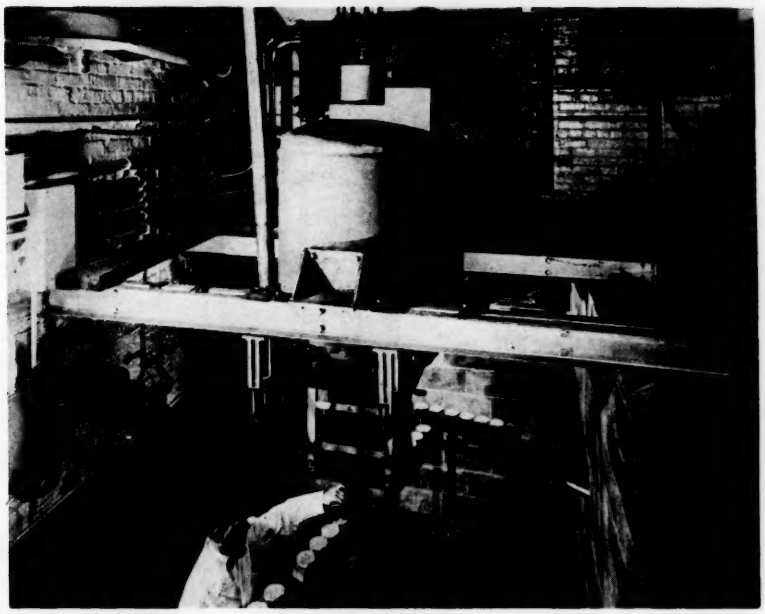


Fig. 1 — Electron generator developed for package and can-line radiation of foods. Product passes under beam where it receives proper dose of reps for preservation purposes. Research today indicates some foods may be irradiated and then stored at cooler temperatures for equal or extended shelf life, rather than at freezer temperatures. Also other foods are best handled in the radiation process and later stored in coolers, after having first been frozen. Photo shows the simplicity of the installations. Pilot model of such equipment has been reported to cost approximately $100,000.—Photo U.S. Army.

QM Institute Observes 20 Years of Food Processing Developments and Outlines Research on

Radiation Preservation of Food

TWENTY years of rationing and packaging advances was celebrated at Chicago, March 13, by the Quartermaster Food & Container Institute of the Armed Forces. At an open house observance, talks by QMF&CI officers and technicians covered recent developments in radiation preservation, simplified logistics, and aerial delivery of supplies. Press and industry guests were treated to a mid-day luncheon of completely dehydrated foods, plus a tour of the Institute facilities.

Limited budget for equipment and personnel held Quartermaster Research & Development projects to a minimum in 1936. In the 1940's, things developed fast. An extensive laboratory, staffed by military and civilian specialists headed by Colonel Rohland A. Isker, chalked up accomplishments such as military tactical rations, boneless beef, dehydrated vegetables, improved dairy products and better, more rugged packaging.

Today, under the name The Quartermaster Food and Container Institute for the Armed Forces, the "Quartermaster Lab" and its 300 personnel headed by Colonel J. D. Peterman and Scientific Director Donald K. Tressler, apply latest research techniques to the development for military use of food and packaging items needed by the Armed Forces. Problems come to the Institute from military operations and planning, and from industry itself.

The Institute is under the QM Research and Development Command, Natick, Mass., Brigadier General C. G. Calloway, commanding. Recently, the Command, along with all other military-founded programs, has been intensifying programs designed to anticipate demands of future warfare. The program of the Institute, has been oriented in the direction of simplified logistics. Emphasis is on precooked unit meals, on dehydrated foods including meat, on new methods of processing such as radiation preservation, and on the attainment of adequate nutrition and palatability in new types of rations, and adequate protective qualities in the packaging.

Food phase of the Institute program is directed by Dr. Robert G. Tischer; container projects are under Albert V. Grundy. Food research includes keeping aware of the relationship of military feeding to other military functions, and adjusting rations to manufacturing techniques, to military transport, storage media, and preparation facilities. Major concern in modern military packaging

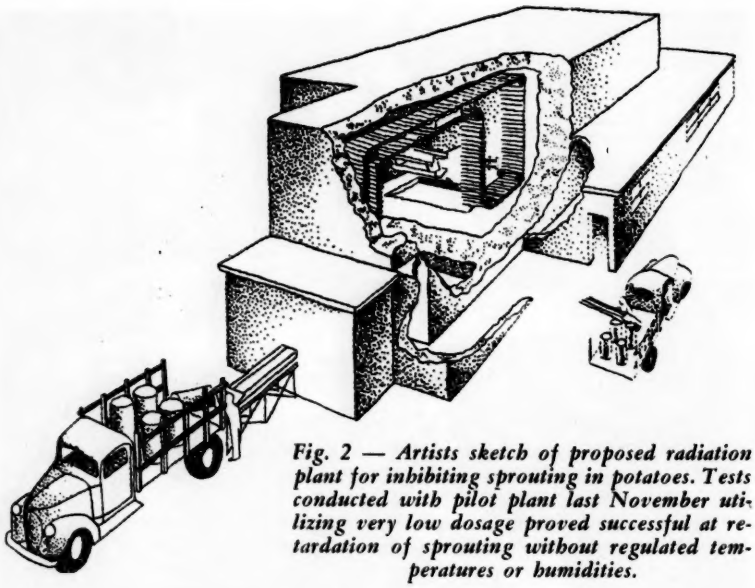


Fig. 2 — Artists sketch of proposed radiation plant for inhibiting sprouting in potatoes. Tests conducted with pilot plant last November utilizing very low dosage proved successful at retardation of sprouting without regulated temperatures or humidities.

is aerial delivery. Research and development is directed toward properties required for shipment and delivery of supplies by air.

Irradiated Foods Mission

According to Colonel J. D. Peterman, Commandant, QMF&CI work with regard to radiation preservation of foods is founded on the anticipated military need in future combat for foods fresh in taste that can be supplied and stockpiled for a brief period in remote areas of military concern — areas where foods cannot now — because of the undeveloped nature of the region — be transported in the refrigerated state and stored cold. Following Colonel Peterman on the program, Scientific Director Dr. D. K. Tressler explained the Applications Engineering work of the Institute, the personnel make-up, and acknowledged the cooperation and assistance of Industry. "The Institute could not begin to accomplish its program without the cooperation of the technical personnel of a large number of food packers, container manufacturers and other industrial organizations," said Tressler.

Industry Participation

Industry Advisory Committees are necessary to advise The Quartermaster General and particularly the Institute regarding problems arising in research and development work on, and production and procurement of, Armed Forces items and related matters. The Committees are composed of 300 individuals who constitute 46 groups, representative of the specific industry involved. Each of these Committees meets once or twice a year to discuss and give advice on current problems.

A large number of universities, colleges, institutions, industrial organizations and commercial laboratories cooperate with the Institute under research and development contracts. Approximately 76 such research and development contracts involving a total expenditure of approximately $1,000,000 have been let. In addition, there are 12 "No Cost" or gratis contracts with food packers and manufacturers who carry out research and development work of interest to the Government without reimbursement.

Radiation Food Preservation

Probably the most interesting discussion on the Institute celebration program was handled by Captain Reuben Pomerantz, Radiation Sterilization Officer. Complying with the intent of the Legislative and Executive branches of the Government, the Army has embarked upon an extensive program to determine the possibility of preserving food by nuclear radiations, stated Captain Pomerantz. Reviewing the basic invention and application by ionizing radiations to food preservation, he stated when viewed in broad perspective, that atomic radiation processing of food to reduce deterioration and spoilage during handling and storage offers a great potential to the food industry.

Possibilities of maintaining high quality in food by use of treatments not involving high temperatures has led food researchers and the food industry into the use of dehydration, freezing, lyophilization[1], chemical treatment, antibiotics and many others, said Pomerantz.

In the development of all these processes, including irradiation, the basic aim is always to find a process or treatment which will kill microorganisms, inactivate enzymes, and if at all possible, reduce the rate of chemical and biological reactions without adversely affecting the original quality of the food commodity. *All the processes so far discovered seemed to fall short of this idealistic goal.* IT IS PROBABLE THAT RADIATION WILL ALSO FALL SHORT OF THIS OPTIMUM; however, it is *HOPED* that certain beneficial results will be obtained by this new technique.

TABLE 1 — Dose Requirements For Radiation Processing*

Roentgens	Effect
2,000,000	Total sterilization
250,000-500,000	Irradiation & refrigeration
20,000-50,000	Insect irradiation
10,000-20,000	Inhibit potato sprouting

*QMF&CI of AF, Chicago

Sources of Radiation Energy

Keeping his remarks factual, as compared with "science-fiction" that has unfortunately made the public press, Pomerantz continued: "Of the numerous forms of electromagnetic radiations and particulate beams available to the nuclear physicist, cathode rays and X-rays, or gamma radiations, are the only types which are of paramount importance to the food industry.

"Cathode rays are streams of high speed electrons which are emitted either naturally from radioactive sources or, more significantly, from man-made generators. The limitation of the electron source is its restricted penetration (1/5 to 1/2 inch).

"Gamma rays are not considered to be particles at all, but rather they are electromagnetic waves. They are emitted by certain natural elements but their principal availability is from waste products produced in nuclear reactors or from isotopes which have become radioactive by exposure to nuclear bombardment. This type of radiation has the distinct advantage of extensive penetration."

Pomerantz then broke his discussion up into the various forms of preservation by radiation. First, he discussed the type which is QMF&CI's principal objective — the complete commercial sterilization of foods so that they can be stored without refrigeration over long periods of time.

[1]Lyophilization; freeze drying.

Selected Items Irradiated

To attain sterility, doses of 1.5 to 4 million rep[2] are required; and, unfortunately, in addition to the drastic effect upon the food spoilage micro-organisms at these high dosages, subtle biochemical changes are induced in the foods which result in many cases in the alteration of color, odor, flavor or texture. Pomerantz stated it was especially interesting to note, that certain selected items such as pork, pork sausage, bacon, sweet potatoes, brussels sprouts, green beans, chicken, beef liver, codfish cakes, and halibut fillets have been able to withstand these high sterilization levels of irradiation without deleterious results.

In contrast to the changes in food acceptability caused by sterilizing dosages, a relatively low radiopasteurization treatment can be given to many foods without altering their acceptability. Such a process utilizes two to 10 percent of the sterlizing dose of irradiation and reduces the population of the micro-organisms 90 to 99 percent. *Then, by the use of post irradiation refrigeration, the residual microbial population can be prevented from reproducing.*

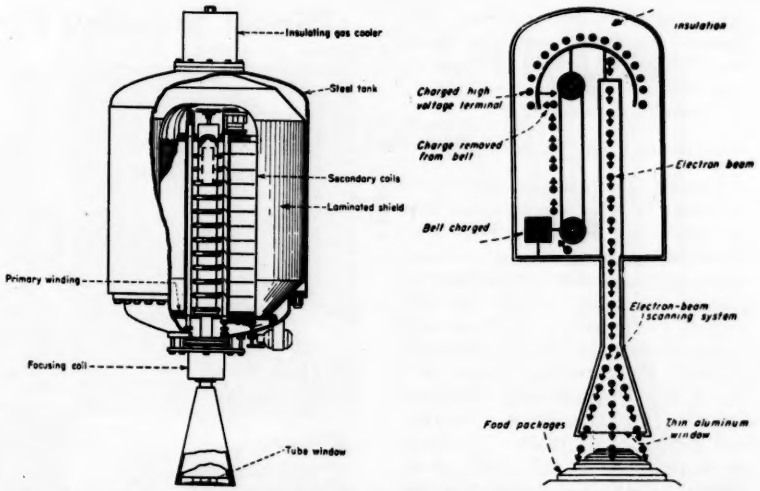
Speculates on Consumer Use

This type of treatment may have a significant effect upon the wholesaling and retailing of fresh packaged meats, said Pomerantz, since the refrigerated shelf life, after irradiation, can be extended as much as fivefold.

Partial Consumer Successes

Use of relatively low doses of eight to fifteen thousand rep[2] has been shown to effectively inhibit sprouting of onions and potatoes. In addition, reduction in weight losses and respiration rate have been reported in long-term storage studies. A dose of 25,000 rep[2] has been shown sufficient to break the cycle trichinosis caused by human consumption of trichinae infested fresh pork.

An extensive research effort is being performed with the cooperation of the Surgeon General and the Food and Drug Administration to determine that irradiated foods are both safe and wholesome when fed in large amounts over long periods of time. The sub-acute and chronic animal feeding studies, as well as the human metabolic studies have been under way for some 18 months now, and to date there has been no concrete evidence of any toxic effects, stated Captain Pomerantz. Further, the program's first long-term feeding project is now under way on a product receiving a dose of 15,000 rep.[2] The first product selected was potatoes, and 70,000 pounds were recently irradiated for the long-term feeding and economic feasibility program.



Figs. 3 and 4 — Cutaway and sectional sketch of electron generator pictured in Fig. 1. A food package or can conveyor line would pass from left to right or vice versa beneath the tube window in the cutaway sketch. The section (Fig. 4) is a right angle view of Fig. 3.—Photos Courtesy U. S. Army

Captain Pomerantz recognized that the process of using ionizing radiation must be shown to be economically feasible and commercially competitive to the current methods of food processing. Cost estimates today, he said, are quite hypothetical since there are no proven cost data on the type of equipment which will be required in the future for large-scale commercial production. Many persons have ventured estimates along this line, and the consensus would indicate that sterilization can be obtained at a fraction of one cent to ten cents per pound. The inhibition of sprouting can be obtained at a cost of 14 cents to $5.00 per ton, and the deinfestation of cereal products has been estimated to be in the price range of ten cents to a dollar per ton.

Dehydrated Foods Speaker

Explanation of the Institute's work in dehydrated food lines was elaborated on by Virgil O. Wodicka, Associate Director for Development and Applications Engineering, Food Laboratories. Mr. Wodicka indicated that the problems of feeding an army can be simply stated (though not so simply solved): (1) Regardless of widespread belief to the contrary, most men will not eat what they do not like, even in the Army. (2) Men like food which resembles what they got at home. (3) Many of the familiar foods are palatable only when hot. (4) For supply efficiency, the food should be non-perishable. (5) In waretime, it is difficult to get, train, and keep enough capable cooks to meet the need.

What is needed, continued Wodicka, is a ration made of foods which can be kept for long periods without refrigeration, which can be prepared for eating with little or no special training, which can be supplied to the soldier hot or be palatable cold, and which will be pleasing and nutritious when he gets it.

According to this Associate Director of the Institute, THERE ARE NOT MANY WAYS KNOWN BY WHICH FOODS CAN BE PRESERVED WITHOUT REFRIGERATION. Canning is an obvious one, but soldiers who have lived on only canned rations for extended periods can describe its limitations quite graphically. RADIATION OFFERS PROMISE BUT IS STILL IN THE RESEARCH STAGE. *Dehydration presently gives the most favorable combination of promise with practicality.*

Milk, eggs, several vegetables, and some fruits were dehydrated for use in World War II. After the war, it became possible to look at dehydration on a long-term basis instead of as an emergency measure, and the dehydration of peas, green beans, and lima beans was investigated. All these are now available with good quality. *Dried whole milk has been*

[2]Rep: Roentgens equivalent physical; an intensity measure of energy units on the object of radiation; could be compared with radiated heat energy and candle power on the surface of a material near an incandescent light bulb.

the most stubborn problem. This, though improved somewhat since World War II, is still far from the equivalent of fresh fluid milk in the judgment of the soldier.

Dehydrate Meat Successfully

Possibly the *greatest advance in dehydration since the war has been on meat,* said Wodicka. Techniques of *drying products at high vacuum from the frozen state* were intensively studied during the war but the high cost of the process and the demand it would make for critical materials to build the necessary plants ruled it out. Developments since then have brought the price down somewhat, and further study of this process in many places along with study of alternative methods of preservation has now led to the conclusion that for the early future *this is the method of greatest promise.*

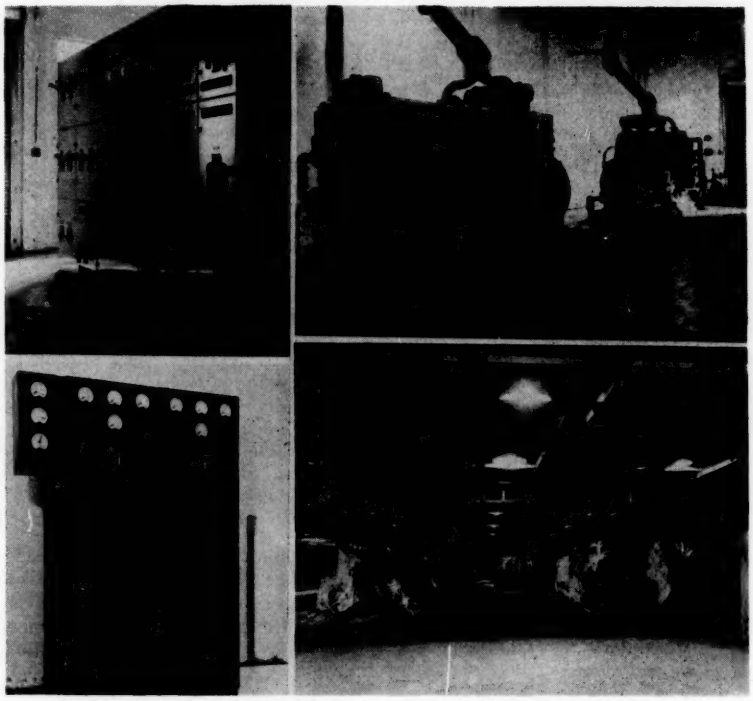
Dehydrated foods have many advantages in military feeding. They are as stable as any others and more stable than most when stored at the high temperatures which are frequently unavoidable in military operations. On the other hand, they do not freeze at low temperatures. Except for the meats, they occupy less space than their fresh, canned, or frozen counterparts, averaging perhaps a 10 percent saving on this factor. They obviously weigh less up to the point where water must be picked up for reconstitution. Weight saving is seldom less than 50 percent and sometimes approaches 90 percent.

Because of the logistic advantages, the Armed Forces have been fostering work on dehydration, and results are beginning to show now in increasing numbers of dehydrated foods going into the supply system in regular production rather than experimental quantities. Much work remains to be done, according to Wodicka. *Many of the products listed are promising but something short of perfect.* More items are needed to round out a menu cycle which will avoid monotony. *Supply of the necessary quantity and quality of water presents problems.*

Technologists on Radiation

RESEARCH and Development Associates, Food and Container Institute, Inc., a society of technologists, at an April 11 meeting in Boston, Mass., Statler Hotel, had many of the QMF & CI civil and military experts as guest speakers. Radiation of foods and meat dehydration preservation methods were among the topics.

Diesel Standby Power In Food Storage



Food Fair Stores of Florida, Inc., Miami, operates a large warehouse of some 400,000 square feet, 70,000 square feet of which is refrigerated storage to service 52 Food Fair retail stores in the Miami area.

500 tons of refrigeration capacity is supplied by 4 York 125-ton compressors. To protect against a prolonged power failure in the event of a hurricane, two Caterpillar D397 Root Blown Diesel Electric Sets are used for standby power to maintain the refrigeration load.

Pictured are the Diesel engine control panels, the two Caterpillar Diesel Electric sets and the meat cooler storage.

Velocity can be Major Factor in Corrosion of Metals

VELOCITY can be a major factor in the corrosion of metals, Dr. H. R. Copson, of The International Nickel Company, Inc.. said recently before the annual meeting of the National Association of Corrosion Engineers. He said that like most factors influencing corrosion, the effects of velocity are varied and sometimes appear conflicting.

An increase in the rate of movement of the environment past a metal part usually increases the corrosion by supplying the corrosives at a faster rate, the speaker noted, adding that the corrosives can reach the metal surface more readily because the motion thins or removes any quiescent layers at the metal surface. On the other hand, uniform motion may be beneficial because it makes the exposure conditions more uniform, and thus may prevent local attack and pitting. Some motion is definitely beneficial if inhibitors are present. In the extreme case, high velocity may induce passivity and stop all corrosion.

The more damaging effects of velocity are often due to turbulence, Dr. Copson said. The turbulence may set up differential aeration cells and metal ion cells which lead to rapid local attack. The turbulence may form anodic areas by eroding away thin protection films, in which case the attack is called erosion-corrosion. A high ratio of cathodic area to anodic area increases the rate of penetration in these cases.

Velocity effects are different on different metals, the speaker said, and accordingly the galvanic behavior of couples may be changed greatly. Actual erosion of metal can be caused by very high velocities, particularly if solids are present. Related to velocity effects is the damage caused by cavitation-erosion.

Warehousemen Meet in Annual Convention Business Progress and Association Interests Surveyed

SECRETARY of Agriculture Ezra Taft Benson's award as Man-of-the-Year was the outstanding public event of the American Warehousemen's Association 65th Annual Meeting, but the report of the National Association of Refrigerated Warehouses' Cost Committee appeared to take top honors in educational importance over all other events at the week long sessions. The election of officers of the Association and its two divisions was of course of prior importance.

AWA's new general president is Millard W. Young, National Ice and Cold Storage Company, San Francisco. Gilbert J. Stecker, president, Merchants Ice and Cold Storage Co., Inc., Louisville, Kentucky, will serve as NARW's new president. The new president of AWA, Merchandise Division is C. J. La Mothe, president, St. Louis Terminal Warehouse Co., St. Louis, Mo.

R. M. King, president, King Storage Warehouse, Inc., Syracuse, N. Y., was elected general vice-president. Mr. King is the immediate past president of the AWA Merchandise Division.

W. A. Morse, president, Security Warehouse Co., Minneapolis, Minn., was reelected general treasurer. William Dalton, Washington, D. C., was retained as general secretary.

Beginning his career in the refrigerated warehousing industry in 1917, Mr. Young is a director of the National Association of Ice Industries and past President of NARW. He also has served as president of the Pacific States Cold Storage Warehousemen's Association and president of the California Association of Ice Industries.

Mr. Stecker, native of Wisconsin and graduate of Northwestern University, served as vice-president of the National Association of Refrigerated Warehouses for the year 1955-56. He also has been a member of NARW's Executive Committee as well as NARW's Industrial Relations and Legislative Committees.

Mr. La Mothe, a St. Louis civic leader and expert in the field of commodity distribution, was vice-president of the Merchandise Division of AWA for two years. Last year, he was National Councillor for the AWA to the U.S. Chamber of Commerce.

Other officers of the Merchandise Division elected were F. D. Bateman of Chicago, vice-president, and R. C. Greeley of Cleveland, treasurer. Executive Secretary Donald E. Horton and Assistant Secretary Allan D. Walters, both of Chicago, were returned to office.

In the NARW division the new vice-president elected at this meeting is S. A. Kadane of Dallas. William E. Ready was re-elected as treasurer. William Dalton remains as executive vice-president and Joseph H. Colquitt as secretary.

AWA Officers — General

President, M. W. Young, San Francisco, Calif.

Vice-President, R. M. King, Syracuse, N. Y.

Treasurer, W. A. Morse, Minneapolis, Minn.

Secretary, William Dalton, Washington, D. C.

NARW Officers

President, Gilbert J. Stecker, Louisville, Ky.

Vice-President, S. A. Kadane, Dallas, Texas.

Treasurer, William E. Ready, Indianapolis, Ind.

Executive Vice-President, William Dalton, Washington, D. C.

Secretary, Joseph H. Colquitt, Washington, D. C.

Executive Committee: Gilbert J. Stecker, Louisville, Ky.; S. A. Kadane, Dallas, Texas; William E. Ready, Indianapolis, Ind.; John L. Bear, Wichita, Kans.; A. R. Current, Chicago, Ill.; Wm. Giacomazzi, Jr., San Jose, Calif.; Paul V. Henningsen, Portland, Oregon; Chas. L. Henry, Atlanta, Ga.; A. W. Oakley, Jersey City, N. J.; A. P. Ollson, Portland, Ore.; C. B. Eddy, Providence, R. I.; Philip G. Kuehn, Milwaukee, Wisc.; F. D. Newell Jr., Minneapolis, Minn.

AWA General Sessions Hear Secretary Benson's Substitute

General sessions of AWA opened on Tuesday, April 10 with the Star Spangled Banner and an invocation by Reverend Father Joseph Thompson, O.F.M., St. Joseph's Church, Los Angeles. Following introduction of the Association's general and division officers, Roy M. Hagen, President, California Consumers Corporation, welcomed members and their guests. Accepting the Man-of-the-Year award for Benson was Dr. Earl L. Butz, Assistant Secretary of Agriculture. He was followed on the program with addresses by the General President Irving S. Culver, San Francisco, General Secretary, Wm. S. Dalton, Washington, D.C., Treasurer Willard A. Morse of Minneapolis and Vincent F. Caputo, Staff Director, Storage and Distribution Division, Defense Department.

Benson Plaque Presented

As readers will recall, the week of April 9 was a hectic one for Secretary Benson and the present U. S. Executive Branch of Government. Therefore, he was unable to accept his award in person, remaining in Washington at President Eisenhower's request. E. L. Butz, Asst. Secretary of Agricuture, accepted the plaque from I. S. Culver, President of AWA, on behalf of Secretary Benson. Inscription on the walnut mounted engraved plate read "AWA Man-of-the-Year Award to Ezra Taft Benson In Recognition Of His Forthwright Statemanship, Rare Integrity and Christian Service to America and Americans".

In making the award, through the assistant secretary Earl L. Butz, AWA's general President I. S. Culver stressed the fact that AWA is not honoring Mr. Benson in hopes of reaping a monetary gain — through increased storage volume of surplus foods.

"We do not pay tribute to this man," he said, "because he helps our own volume of business. On the contrary, these principles of his, which we recognize today, have been responsible for a distinct slackening of volume of stored surplus commodities in our warehouses. And, if he has his way, our storage volume of government commodities will decrease more.

"Public warehousing," he said, "is a great and dynamic American industry, whose members believe in free enterprise, in free agriculture, in free labor, and free government. And,

AWA Officers for 1956: Standing, Gilbert J. Stecker, NARW President, S. A. Kadane, NARW Vice-Pres., Wm. E. Ready, NARW Treasurer, F. D. Bateman, Merchandise Div. Vice-Pres., and C. J. LaMothe, Merchandise Div. President. Sitting, R. M. King, General Vice-President, M. W. Young, General President, and W. A. Morse, General Treasurer.

we recognize the fact it will take hard work by all of us to keep these things free. If we want to remain independent and have our businesses stand on their own feet, we can't expect to keep running to the Federal Government for a crutch."

Butz Delivers Benson's Talk

Principal address of the AWA Sessions was that of Agriculture Secretary Benson, delivered through his assistant, Earl L. Butz. In his presentation, Benson complimented the warehouse industry on the part they play in today's economy. Without modern methods of warehousing and refrigeration, the Secretary said, we could not maintain our American standards of living even for a single week. Benson compared the warehouse industry to a regulating device, stating that it permits an orderly flow of goods and more stable supplies for consumers with more stable prices for producers. He also likened the industry to a bank, pointing out that the warehouse accepts goods produced and safe-keeps them until they are needed. He pointed out that a warehouse is a way-station on the road of distribution and efficient marketing. It is a highly important bulge in the distribution pipeline between the producer and the consumer.

The secretary also pointed out that his responsibility in the executive department of the government, agriculture, is not sharing properly in prosperity. "More Americans are at work, earning more, producing more, investing more, and building more than ever before in our history. . . Many of our families who own farms and ranches are in trouble. Their costs are too high. Their prices are too low. Surpluses are smothering farm prices and income." According to Secretary Benson, agriculture's problems are the problems of all the people. He diagnosed America's agricultural ills as caused by rigid price support programs and laid the blame for them to the past administration. He also added comments that the ills were brought about by a war-time economy.

Most of our people, the Secretary said, do not realize the storage problems that grow out of our vast surpluses. "At the present time, about 10,000 commercial warehouses are storing government-owned grain under the Uniform Grain Storage Agreements. Almost two billion bushels of storage capacity is represented by these warehouses." CCC-owned storage bins have a capacity of 884 million bushels and purchase of an additional 100 million bushels was authorized recently. "We were reluctant to put the government into the warehouse business", the Secretary said. "We want to reverse this trend of government to take over business."

Turning to research of interest to the warehouse industry, through Butz' reading of his prepared talk, the Secretary pointed out that new information is being provided on the keeping qualities of vegetables. A mechanical aeration system for grain is proving effective, an electronic scale now makes it possible for one warehouse worker to do the work of a crew in weighing cotton, and a recent study has shown how improved methods can bring about a man-hour saving of more than 20 percent in wholesale grocery warehouses.

Press Conference Precedes AWA Opening Session

Officers of the AWA arranged for a press conference to precede the Assistant Secretary of Agriculture's appearance. Under questioning by reporters, Secretary Benson's Chief Administrative Assistant, Earl L. Butz, charged political pressures with having magnified the farm problem. He predicted a presidential veto of the bill then pending passage by the Congress. His prediction was borne out by President Eisenhower's veto of April 16.

Butz admitted farm dissatisfaction and indicated that the administration did not intend to hide it. He expressed confidence that the farmers would vote in November as good citizens in spite of a tendency that we all have to vote our pocketbooks. He credited the present administration with having reduced surplus commodities which stabilized per capita farm income and predicted with further reductions of surpluses, that farm income would take an upward turn. He expressed hope that hog prices would be among the first to rise and that this would come about by November.

Congratulatory Message From President Eisenhower

President Eisenhower sent a congratulatory message, which was promptly displayed in a magnified version on an easel in the lobby of the hotel where the convention headquartered. The telegram stated "Please extend my warm greetings to all attending the 65th Annual Meeting of the American Warehousemen's Association. The members of your organization have an important role in America's dynamic marketing system. They prevent waste and through efficient storage operations help maintain an even flow of farm and factory goods to customers through their fine work as a vital link in the vast network of distribution. I am confident the warehousing industry will continue to help promote economic growth and a rising standard of living."

Food Price Increases Laid to Labor, Transportation, Taxes

William Dalton, General Secretary of the American Warehousemen's Association, took the "middleman" off the hot seat (to use his own expression) and placed the blame for the so-called "price spread" on farm products on the combined effect of higher wage costs, higher transportation costs and higher tax costs. "These three elements together", he said, "have accounted for 75 to 80 percent of the increased spread for every post-war year since 1946".

Dalton acknowledged the continuing increases in the family food budget but pointed out that only three cents of Mrs. Consumer's food dollar makes up the net profit of manufacturers and distributors of food products today as compared with nearly six cents in 1939. He challenged the propaganda that the increase in the price spread between what the farmer gets and what the consumer pays for food is due to profiteering or inefficiency on the part of producers and distributors, and warehousemen.

Actually, according to Dalton, through greater efficiencies in food processing and distribution, including public warehousing, Mrs. Consumer's market basket has been reduced $55 annually. Why Mrs. Consumer wasn't actually ahead on that $55 decrease. Dalton explained, was the fact that $28 was paid by the consumer in the form of higher wages, taxes and transportation costs. The remaining $27, plus an additional $4.00 was absorbed by industry in the form of higher wages, more transportation costs and more taxes. According to the General Secretary of AWA the warehousing industry took up the $4.00 by experiencing a lower Federal income tax through elimination of some excess profit taxes and lower earnings before taxes. He believed that warehousemen members did not benefit much from the excess profit tax removal but may have passed along three or four dollars of the overall market basket reduction out of their own pockets or surplus.

Dalton laid most of the blame for the increased cost at the doorstep of labor unions who pyramid one increase on top of another. The reason that the so-called middleman, Mr. Dalton said, is taking a propaganda beating on this price spread question is because the true facts are not being told. The simple economic facts about both production and distribution in this dynamic American system are not being brought out. It's time the industry started presenting the facts, he added.

Lead-off speaker at NARW Business Session on Thursday, April 12, was F. Gilbert Lamb, Weston, Oregon, NARW member. Lamb is President, National Association of Frozen Food Packers. The moderator and participants were assembled for the panel discussion which followed. Although the name cards are correctly placed for the first row of panelists (NARW's Executive Committee), parties at rear are, l. to r., Treasurer Ready, President Newell, and Committemen Current and Kadane.

Meeting of National Association of Refrigerated Warehouses

BUSINESS meetings of the National Association of Refrigerated Warehousemen got under way Tuesday afternoon, April 10. Following the reports by F. D. Newell, Jr., president, and William E. Ready, treasurer, the executive staff of the association reported through a unique presentation. Executive Vice-President Dalton, became a "Darrell Zanuch" of the industry and presented a color slide story of NARW In Action. As color slides showing the headquarters of AWA-NARW in Washington, D. C., were flashed on the screen, Dalton commented on the various activities and scenes pictured. As the principal staff members appeared on the screen, he switched his commentary to these aides stationed at different rostrums about the meeting room. In order, Joseph Colquitt, secretary, Ray Keiser, counsel, Mrs. Estelle Emmert, administrative assistant, each described their activities on the Washinton scene as slides of other personnel, association papers and materials, fixtures and processes were presented by the color slides.

Committee Chairmen Report

Following the executive presentation, various NARW committee chairman made their reports. A. R. Carstensen, Sacramento, Calif., Chairman of the NARW Safety Committee, called attention of the members present to the safety exhibit placed at the entrance of the meeting room and emphasized the importance of some of the new equipment presented there. He cited the advantages of the new type of disaster mask over the old type cannister breathing apparatus. Color coding was also emphasized in his report. Order blanks for a framed color chart of color coding adopted by NARW in 1955 were available in the booth, together with instructions to be followed in complying with this safety practice.

Patrick H. McIntyre of Los Angeles, discussed the advantages of the NARW executive's plan of group insurance. The NARW insurance counsel followed up on this group insurance presentation with an exhibit located near the meeting rooms in order to serve as adviser to NARW members who might be interested in such a plan of insurance. The group insurance is offered as a service to executives of firms holding NARW memberships.

The Cold Storage Industry Advisory Committee, United States Department of Agriculture, was represented by Harley Banks of the commodity storage section, who reported for Don S. Anderson, Washington, D. C., chairman of that committee. In addition to reporting on some of the USDA findings with regard to storage of certain commodities, the report covered in part some of the commodities purchased by the government and in storage at the present time. It was noted that all surplus butter in storage at present is committed for sale or use at the present time. Of over one billion pounds of butter purchased by the government since the surplus pur-

In recognition of the outstanding service he has performed for his industry—and, in turn, his country—F. D. Newell, Jr., retiring president of the National Association of Refrigerated Warehouses, was presented with a flag which was flown over our nation's Capitol in March. This presentation was made by Immediate Past President M. W. Young of San Francisco, and the authenticity of the flag's Capitol dome flight attested to by Mr. Newell's Congressman, Walter Judd (R-Minn.) in a special letter for the occasion.

chasing program was started, the speaker related, only one-fourth million has been lost. He attributed that loss to flood and fire, and bluntly stated that some of the losses implied in irresponsible news comments was not a fact. He indicated that the warehousing industry had done an exceptional job in storage of these commodities.

As an example of some unforseen damages which did occur he cited a little damage due to an ammonia break in a cheese storage. However, the cheese was tested and released and brought a very high yield in process. He quoted figures on cheese and other non-fat dry milk solids owned by the government at the present time.

Following the USDA report, Vincent F. Caputo, staff director, storage and distribution division, Department of Defense, reported on the position of his division under the new single manager plan of the Department of Defense. The speaker related that he did not personally feel that the single manager plan could be as favorable to industry as the previous arrangement within the defense department. He cited that the government was doing no construction of cold storage spaces at the present time and that his division was doing a job of policing government storages to see that as much refrigerated warehouse business was being placed with private industry as is most efficient and meeting the needs of the defense department.

When questioned as to the statement that the single manager plan could not be as favorable to warehousing industry, Caputo implied that under this plan there would be some opportunity for the Army and the Navy to expand or increase their activities in this field. Henry Pellegrino, a storage specialist in Caputo's division, was also introduced.

Business Forecasts

Business forecasts for the year were undertaken at the first convention session by the Chapter Chairmen. Paul D. Burrill, representing the North Atlantic Chapter, reported that both cooler and freezer storage capacities were down three to 20 percent in 1955. He attributed this to the tendency of chain grocers and distribution firms to construct their own facilities. He expected capacities to be down an additional ten percent in 1956.

In the Southeastern section of the country, W. D. Stella, Jr., reported for the chapter of that area. He stated that they were not too optimistic, although Tennessee shows good strawberry and meat prospects for the year and the Gulf showed excellent shrimp possibilities. Others were depending upon frozen food production which would possibly go into private warehousing. He related that there was six million cubic feet of private warehousing under construction in the Southeastern jurisdiction.

W. J. Lamping, reporting for the Great Lakes Chapter, reported that out of 25 members, four expect less than 50 percent capacity for freezer storage and nine expect less than 50 percent in cooler storage. Altogether he estimated that this area would see approximately 90 percent capacity of freezers utilized and 68 percent of coolers for the coming season.

In the Missouri Valley, Roy L. Smith, reported that freezer capacities are at 61 percent and coolers at 64 percent at present. Volume in this area moves in during May, he related, at which time warehousemen expect an increase of 5 to 10 percent in capacities over 1955.

In the Southwest, R. T. MacKenzie, turned in the most optimistic report, stating that in 1956 the industry in that area looks for things to be even better. Freezer and cooler capacities were expected to reach between 75 to 80 percent.

P. V. Henningsen, reported for the North Pacific Chapter. Being a production area, Henningsen stated they were apprehensive over winter damages and believe their strawberry crop to be down from 20 to 80 percent, and expected no help from military demands for storage. Poultry storage he expected to remain the same, but other commodities he felt would bring tonnages down 15 to 25 percent.

Earl L. Butz, Assistant Secretary of Agriculture, accepts plaque for Secretary of Agriculture Ezra Taft Benson from I. S. Culver, president of the American Warehouseman's Association at Los Angeles.

L. J. Urban, reporting for the South Pacific Chapter, stated that this area expected 1956 to be as good as the past year although all were at their lowest occupancy for many years past.

Legal Liability Insurance

Wednesday morning's NARW business program was given over to a panel discussion on Legal Liability Insurance. Panel was headed by E. E. Hesse, Chicago and members were E. Pym Jones, San Francisco, Raymond C. Cash, Rochester and A. R. Currant, Chicago. Jack L. Dawson, San Francisco, Executive Secretary of the West Coast Warehousemen's Groups was reported ill in a hospital and unable to participate.

The panel discussions followed a report on the effectiveness and utility of a new legal liability insurance policy recommended by NARW's insurance committee following three years of investigation. A questionnaire was circulated by the committee to determine the number of members present who carry warehousemen's legal liability insurance, the amount, whether they contain deductible clauses, premiums, and an inquiry into the members interest in the NARW policy.

Questions discussed from the floor involved the warehousemen's liability

Vincent F. Caputo, Staff Director, Storage & Distribution Division, Office of the Ass't Secy. of Defense, addresses the AWA Opening Session. He later appeared on the NARW program as well.

concerning his refrigerating machinery, actions of local fire departments, unattended refrigerating machinery and contract supervisory alarms. The problem posed by one member involved a contract with a tenant which required the warehouseman to furnish refrigeration for freezing a commodity. The panel was of the opinion that a legal liability policy would protect the warehouseman for his failure to produce refrigeration necessary for freezing the commodity due to refrigerating machinery failure resulting from causes other than negligence.

Some discussion arose as to whose responsibility it was to prove negligence, in connection with both legal liability and fire insurance policies. Concensus was that the proof of non-negligence would rest with the warehouse operator if the insurance company took to a dodge of this nature.

Another member cited a machinery derangement which resulted in ammonia fumes spreading through the work areas and driving personnel into the open. The local fire department was about to hook up to the fire connection in order to purge the system. The owner stopped them just in time and with the use of a disaster mask and protective equipment, entered the building to secure the machinery and proper portions of the damaged system. Responding to his question, the panel was of the opinion that the insurance carrier would protect him against suit by his customers for such damages, but the question as to how the carrier would recover from the city or local government, was left unanswered.

Inquiries on the part of the panel as to member's experiences with regard to insurance coverage for failures in automatic and semi-automatic unattended plants, did not bring any volunteers. The panel was trying to determine if any members were involved in court actions as a result. With regard to both engineer and watchmen services, concensus of the panel was that underwriters prefer supervisory alarms to employment of personnel. With regard to engine room derangements, members indicated that underwriters seemingly were of the opinion that such failures would be of short duration and therefore would not be the cause of any serious product loss.

Cost Committee Report

Not all research for the industry is done by TRRF, at least the report of the Cost Committee NARW, indicated that members of the industry are quite capable of their own cost analysis surveys. An informative and educational review of warehousing costs was presented by the committee, chairmanned by W.V. W. C. Baker, in one of many off-the-record programs on Wednesday.

Report of Refrigeration Research Foundation

Following the Cost Committe Report on the Wednesday session was the Refrigeration Research Foundation Report. Harlan J. Nissen, Los Angeles, President, TRRF, presided. E. F. Jansen, Head, Fruit Processing Section, Western Utilization Research Branch, USDA, Albany, California, reported on Time-Temperature Tolerance of Frozen Foods, and Temperature Taking of Cased Frozen Foods. These were part of his report of the USDA Cold Storage Research Advisory Committee. H. C. Diehl, Research Director, TRRF, added comments to the report and answered questions from the floor.

TRRF brought the Time Tolerance studies to Albany. Purpose of the studies is to determine distribution practices and time delay between frozen production and ultimate consumers. The study is to specifically determine changes of a chemical nature which will effect quality, due to distribution. Further, they are to determine any improvements that could be made in both processing and distributing.

NARW members learned from the TRRF reports that the Time Temperature studies are broken down by products, by geographical origin, and by production seasons. Consumer complaint tests are being conducted rather than submit samples to trained tasting panels. Ten persons are being employed on the project at the laboratory. The project is of five year duration.

Dr. Jansen explained that the laboratory constructed special environment rooms to insure identical conditions to those which are experienced in frozen food distribution methods. Refrigerating and heating equipment is operated from instruments. Operating cams for these instruments are cut to simulate the complete distribution plan. California concentrates, poultry and fruits have been used in the tests. Even remanufactured fruit packs such as used for ice cream and preserves manufacturing have been tested. Spinach and cauliflower are to be tested soon.

Publication of the test results is to be released simultaneously to the public press and to trade and technical publications, according to Dr. Jansen. He experssed hope that the industry would appreciate the enormity of the latter task alone. Publication will be in three parts covering background or reasons for the test, construction of the rooms and equipment, and the actual tests of the commodities submitted. Intent of these tests is to prove that frozen foods have a memory and that mistreatment is cumulative, resulting in poor quality and customer dissatisfaction.

By means of slides, Dr. Jansen explained the method devised by the laboratory of taking product temperature within cased products without the requirement of opening or damaging the cartons. The method consists of providing cases or cartons with a bulls-eye. A dial thermometer stem is inserted thru the bulls-eye. Since tests at the laboratory have proven that the critical package or container in a case is at any corner, the bulls-eye is arranged so that the thermometer stem will come to rest three inches alongside the center of the container nearest the corner. Two targets or bulls-eyes are suggested for cases, at opposite sides.

Supplementing the speaker's remarks, Dr. Diehl pointed out that TRRF contributes $2000 to this sort of research conducted by the Government facility as compared with a $125—150,000.00 appropriation by the Government for this purpose each year. Research Foundation funds are used principally to make outside purchases of test materials which eliminates a great deal of red tape that would be involved were Government funds used for this purpose.

The Research Advisory Committee Report also mentioned tests conducted on cases, containers, cartons, etc., at another Government laboratory at Madison, Wisc. to determine fatigue of packaging materials.

Director Diehl also expressed an opinion that the USDA's Cold Storage Research Advisory Committee Report was among the best works reported at the International Congress of Refrigeration held in Paris, France, last Fall. According to Diehl the Committee's report was most practical. He also pointed out some of the works of the committee in process at the present time which had been recommended by TRRF, such as freezing of baked goods and bacteria control over meat in process. Election of executive committeemen concluded the Wednesday sessions.

Distribution of Frozen Foods

NARW business sessions on Thursday were addressed by F. Gilbert Lamb, President, National Association of Frozen Food Packers. Mr. Lamb, an NARW member from Weston, Oregon, discussed distribution of frozen foods and asked the industry's cooperation in improving distribution methods for frozen commodities. He reminded warehousemen that distribution problems were their problems also, not only for the packer, broker, public carrier and retailer.

Following Lamb's discussion the executive committee formed a panel for a so-called brain storm session. This session was divided into four activities. Participation in the discussion was limited to membership and problems discussed were "off-the-record". The executive committee handle questions from the floor. Specific problems were referred to small groups for discussion and the discussion leader of each group reported back any conclusions or solutions suggested for the problem assigned to his group.

Another portion of the morning session was given over to a discussion of What Big Labor and Big Government Mean to the Refrigerated Warehousemen. NARW Industrial Relations and Legislative Committees, together with Ray E. Keiser, Manager, NARW Legislative-Industrial Relations Department, made up the panel for handling discussions of this nature. William E. Ready, NARW Treasurer, summed up the morning's discussion prior to recess for the day.

Warehouse Construction And Modernization

Friday business sessions of NARW opened with a panel discussion on refrigerated warehouse construction and modernization. Gilbert J. Stecker, NARW's Vice-President, served as moderator. Other members of the Panel were L. R. St. Onge, York, Penna., J. C. Irwin, Kansas City, Allan W. Cox, Toledo, and L. E. Smith of San Francisco, with V. C. Stevens, NARW's Warehouse Operations Committee Chairman.

One of the first questions popped at the panel concerned the advantages of single-story construction over multi-story, or vice versa, if there were any. V. C. Stevens, Dallas, parried the question, reminding the questioner that there are many factors that would have to be taken into consideration before arriving at any conclusion as to which would be the better structure for a particular location. He drew on the experiences of his own firm in their operation of both a vertical structure and a horizontal one. He cited the advantages and disadvantages of both types of construction for each particular location.

Dock Height for Cars

Another question concerned the proper dock height for refrigerated railroad cars. Panel member J. C. Irwin indicated that his firm had made an extensive survey of railroad cars before constructing their newest plant. They found that floor racks in refrigerated railroad cars range from 46 to 67 inches above the rails. Therefore his firm had settled on a standard of 54 inches as average and uses various leveling devices to offset any inequalities between car floor and dock height. Even at that, it was pointed out that some commodities are received at refrigerated storage in other than refrigerated cars. It is, therefore, considered advisable to have a portion of trackage raised about eight inches higher to accommodate shipments of this nature. In particular, he was referring to the receipt of cased canned goods in ordinary box cars. From a nearby or local cannery it is a matter of overnight switching by the railroads and refrigerated service is not required.

First Considerations

The question was asked as to what first considerations should be in modernizing old or constructing new facilities. Panel member Stevens concluded most of the panel remarks by stating that type of operation and materials handling requirements should be the first consideration. An analysis of the revenues desired or probable would be the second factor. A little later in the discussion the question came up concerning modernization of a multi-story building. Again panel consensus was that materials handling and its mechanization should be the first consideration.

Floor Insulation

A question of floor insulation was raised. The panel was not at all in agreement as to when and where insulation should be used or omitted. Agreement could not even be reached on insulation between rooms where a cooler was located over a freezer. It was emphasized that where the cooler is so located and insulation is omitted, an adequate amount of dunnage spaced properly should be used on a cooler floor to prevent freezing of the product.

On this topic, panel members cited their own experiences where some plants of a particular firm had insulation on the floors and were experiencing no frost heaving problems, but they found the same situation described at some of their newer plants where there was no insulation installed. Still other members of the panel had trouble with both types of installations. It was concluded that local circumstances altered cases and that whether insulation is used or not, some means should be provided for applying heat to the soil as a measure of assurance against future trouble. The present project instituted by TRRF and being conducted at the University of Minnesota was cited and the panel held that reports of this research would probably give the industry the answers it needs in the next few years.

Converting to Automatic

A question arose as to the advantages of converting equipment to automatic operation. Speaking for the panel, L. R. St. Onge, said that there is definitely a trend in that direction. However, he cautioned that automatic or semi-automatic plants did not always mean unattended plants, and cited a few difficulties that some operating firms had encountered. Automatic control and alarm devices are subject to the same failures as the basic equipment. During periods of little or no warehouse operation unattended plants supervised by contract alarm systems and automatic shut-down equipment, were believed adequate and satisfactory. However, the panel conclusions indicated that automatic or semi-automatic plants should be attended during normal warehousing or freezing operations.

Questions regarding new types of finishes for insulations were referred to panel member Cox. He discussed some of the new types which were basically variations of magnesium-oxychlorides. They are being received in the industry with a great deal of enthusiasm and success. Most, he related, are adequate for surface

finishes in compartments down to minus 80 F. These are applied over boardforms of insulation. A few of these have been certified by the Underwriters Laboratories, Inc., and afford an owner some consideration by his insurance underwriter for their fire retardant or flame proof qualities. Cox also discussed the various types of finishes over dry wall types of construction emphasizing the importance of the finishes being porous or capable of passing moisture to the low temperatures of the room.

The question of first factors to be considered in the conversion of coolers to freezers came before the panel. Panel consensus was that physical or construction features and insulation problems should be considered first; secondly, the refrigerating equipment — that is, the additional capacity requirements should be considered also.

The question on whether or not humidity controls pay, was parried by the panel, members stating that local conditions, revenues to be gained over long term periods etc., were all involved in a question of this nature. Following that, a question was asked on the pull-down rate on new freezers. Panel member Cox replied that ten days to two weeks would be safe and reliable rate; depending on the room size and the construction used.

A question asked which brought a good laugh to most present, was on how power bills could be reduced. L. E. Smith ran over the usual list of items that could be checked, such as condensing temperatures and pressures, amount of evaporative surface, multi-staging of refrigeration systems, etc.

Receiving and Shipping

The last question presented the panel before time ran out concerned problems in receiving and shipping, and communications in one-story vs. multi-story structures. A single-story operator on the panel pointed out the difficulty that his firm had with receiving trucks during busy periods. Adequate dock space was always available but the drivers opened up their vans and allowed the commodity to warm up while waiting unloading. It was necessary to assign a man to police the vans. He presumed that vertical structures would not be faced with such a problem as trucks would remain closed and refrigeration units operating while they remained on the street. Communications appeared to be another disadvantage of the single-story construction and involved some type of closed communication circuit with the front office, dispatcher and receiving-shipping points. To some extent vertical structure panel members indicated that similar communications problems were felt in their operations as well.

Tax Outlook for 1956

Charles R. Lees, partner in charge of tax department of Peat, Marwick, Mitchell & Co., Los Angeles, spoke on "Practical Tax Suggestions and Advantages for the Refrigerated Warehousing Industrying". Mr. Lees gave the tax outlook for 1956 as well as reviewing new regulations on accelerated depreciation methods provided for in the 1954 Internal Revenus Code. He also discussed travel and entertainment expenses, the filing of declarations of estimated tax by corporations, the possible double deduction for accrued vacation pay, and the profit sharing and pension plans as a means of saving taxes and increasing employee morale.

Safety Awards

A. R. Cartensen, Chairman NARW Safety Committee, then presented the safety awards to NARW member firms who had operated during 1955 without a lost time accident. Where a representative of the firm was present, Carstensen called him up and presented a safety certificate for display in the offices or in a prominent location in the plant.

The companies to whom awards were made for operating one year without an accident were as follows: Beall Refrigeration Company, Santa Clara, Calif.; Butler Warehouse, Inc., Brooklyn, N.Y.; Chouteau Av. Crystal Ice & Cold Stg. Co., St. Louis, Mo.; Colonial Ice Company, Roanoke, Va.; Colonial Ice Company, Savannah, Ga.; Crystal Ice & Cold Stg. Co., Sacramento, Calif.; Diamond Ice & Coal Co., Charleston, W. Va.; Glassboro Cold Storage Corp., Glassboro, N. J.; Haddon Ice & Coal Co., Haddonfield, N. J.; Harrisburg Cold Stg. Co., Harrisburg, Pa.; Hermitage Ice and Storage, Richmond, Va.; Holly Cold Storage Co., Oakland, Calif.; F. G. Lamb & Co., Weston Oregon.; Merchants Refrigerating Co., Buffalo, New York; Merchants Refrigerating Co., Hopkins, Minn.; Merchant Refrigerating Co., Newark, N. J.; Modern Ice & Cold Storage Co., San Jose, Calif.; The Mowery Cold Storage, Bowmansdale, Pa.; North American Cold Storage, Chicago, Ill.; North East Cold Storage Corp., Portland, Maine.; Oklahoma Cold Storage Inc., Oklahoma City, Okla.; Polar Cold Storage Co. Sioux Falls, S. D.; Rahal Cold Storage Co., North East, Pa.; Scobey Fireproof Storage Co., San Antonio, Texas; Terminal Ice & Cold Storage Co., Portland, Oregon; Terminal Refrigerating Co. (River Plant) Los Angeles, Calif.; Turlock Refrigerating Co., Turlock, Calif.; Tyler Warehouse & Cold Storage Co., St. Louis, Mo.; Union Ice & Storage Co., Chico, Calif.; Union Ice & Storage Co., San Jose, Calif.; United States Cold Storage Corp., Detroit, Mich.; Upton Cold Storage Co., Inc., Rochester, N.Y.

A report of the Resolution Committee followed. The election of officers and their installation then took place, followed by adjournment.

Unique in methods of opening business sessions, was the NARW plan of opening each business session with a movie. Each visual production dealt with some phase of the warehousing business, either with people, products, sales, communications or the like. They all carried a definite message that served a dual purpose in allowing tardy members to enter the sessions with a minimum of disturbance and to be in their places when the speaker or panel discussion got under way.

Social Program

The social program included the usual welcome reception on Monday evening with the members and their guests enjoying refreshments, music and snacks through the courtesy of the California Warehousemen and their ladies. The annual informal party took place at a reception on Tuesday evening followed by dinner, dancing and entertainment, Hawaiian style. Members were delighted with the surprise appearance of Dorothy Lamour at their party. Miss Lamour was playing in the hotel.

Wednesday and Thursday afternoons were open, with no sessions being held. A Disneyland tour was arranged for the Wednesday opening and a movie studio tour took place on Thursday. Thursday evening was the President's Reception, followed by the 65th Annual Dinner. Entertainment for this dinner was provided by Sam Lesser, famed Hollywood theatrical agent.

A unique arrangement in the entire convention program were the bonus sessions. NARW and TRRF staff members made themselves available on Wednesday and Thursday afternoons to answer questions and provide data or information to those members who did not participate in the Disneyland or movie studio

(Continued on page 58)

Refrigeration Research Foundation Reviews Progress at Annual Meeting

ELEVATE refrigerated space selling to professional level, was the theme of an address by Roy M. Hagen, first President of the 14-year-old Refrigeration Research Foundation, Inc., at the annual meeting of the "not-for-profit" organization, held in the Statler Hotel, Los Angeles, April 9, 1956. Sharing the speakers rostrum for the purpose of reports to the membership were Dr. Samuel Cate Prescott, Chairman of the Board, Harlen J. Nissen, President, Dr. W. A. Schoenfeld, Chairman of the Prescott Fellowship Award Committee, Mack A. Hunt, Asst. Treasurer, and H. C. "Dutch" Diehl, Research Director. Seven Directors were elected at this meeting, two of them returning to the Board for their second three-year terms.

New Board of Directors

Directors elected to terms expiring in 1959 are C. A. Bowen, Nashville, Tenn., Jules L. Gagini, Omaha, Nebr., J. R. Goodfellow, Seattle, Washington, Stanley C. Hoffberger, Baltimore, Md., Wm. E. Martin, Vancouver, B.C., Canada, Harlen J. Nissen, Los Angeles, Calif., and Garth A. Shoemaker, Elmira, N. Y. Nissen and Shoemaker were Director incumbents.

Executive committeemen for the 1956-57 terms, elected by the Board of Directors, are Charles E. Adams, Jersey City, N.J., C. A. Bowen, Jr., E. M. Dodds, Kansas City, Mo., H. J. Nissen, G. A. Shoemaker, G. L. Stecker, Louisville, Ky., H. W. Wilson, Philadelphia, Pa., and Millard W. Young, San Francisco, Calif. Wilson, Bowen, and Young are new members of this committee, replacing James F. Kuehn of Milwaukee, C. E. Simmons, Oklahoma City, and F. D. Newel, Jr. of Minneapolis, Minn.

Officers of the Foundation were all re-elected. They are Dr. S. C. Prescott, Chairman of the Board, Cambridge, Mass. H. J. Nissen, President, G.A. Shoemaker, Vice-President, G. L. Stecker, Treasurer and Assistant Secretary, H. C. Diehl, Secretary and Research Director, Colorado Springs, Colorado and Mack A. Hunt, Asst. Treasurer.

Space Selling With Professional Manners

After reviewing improvements in the refrigerated products sponsored or initiated in the 13 years of TRRF history, first president Hagen launched into the idea that the day has arrived for the refrigerated warehousing industry and the Foundation to take similar steps to sponsor and initiate professional methods of space selling. He criticized the practice of underselling competitors.

Positive practices, not negative ones are needed. He urged warehousemen to sell services, not cubic feet or square feet of space. Using the skilled surgeon as an example, Hagen pointed out that the patient was invoiced for the quality of professional performance, not for space and time of the operating room occupancy.

He cited many examples of services which could be provided to clients. Sub-scalding of turkeys before freezing was one example of utilizing available space or facilities, as a service incidental to the space sale, but nevertheless promoting refrigeration applications.

He reviewed briefly some of those projects by the Foundation, reports of which could be useful selling tools. They included the refrigerating of dried fruits, odor control, marketing of eviscerated poultry, and the freezing of eggs. It included the marketing of fresh and frozen shrimps and turkeys; the freezing of citrus concentrates and cooked frozen foods and the storage of cheese and carrots.

Officers and Board of Governors TRRF 1956

Dr. Samuel C. Prescott, Chairman of Board
Harlan J. Nissen, President
Garth A. Shoemaker, Vice President
Gilbert L. Stecker, Treasurer and Ass't Sec'y
H. C. Diehl, Secretary and Director
Mack A. Hunt, Ass't Treasurer

Executive Committee

Harlan J. Nissen, Chairman (ex officio), Los Angeles
Charles E. Adams, Jersey City
C. A. Bowen, Jr., Nashville, Tenn.
E. M. Dodds, Kansas City
Garth A. Shoemaker, Elmira, N. Y.
Gilbert L. Stecker, Louisville
H. W. Wilson, Phila., Pa.
Millard W. Young, San Francisco, Calif.

Board of Governors

Representing the Public

Dr. Laurence V. Burton, Packaging Consultant, Scarsdale, N. Y.
Edwin T. Gibson, Eisenhower Exchange Fellowships, New York, N.Y.
Dr. Louis B. Howard, Director and Dean, Illinois Agricultural Experiment Station, University of Illinois, Urbana, Ill.
Col. Paul P. Logan, Director of Food Research, National Restaurant Assoc., Chicago, Illinois
Dr. Samuel C. Prescott, Emeritus Dean of Science, Mass. Institute of Technology, Cambridge, Mass.
Harry J. Reed, Director and Dean Indiana Agricultural Experiment Station, Purdue University, Lafayette, Ind.
Dr. William C. Schoenfeld, Emeritus Dean and Director, Oregon State College, Corvallis, Ore.

Term Expiring 1957

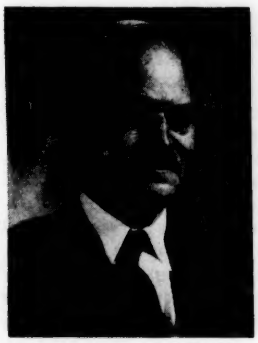
Charles E. Adams, Jersey City, N.J.
E. M. Dodds, Kansas City, Mo.
John K. Dozier, Houston, Texas
Herbert Farnsworth, Boston, Mass.
William Giacomazzi, Jr., San Jose, Calif.
F. J. Roos, Davenport, Iowa
J. W. Straub, New York, N. Y.

Term Expiring 1958

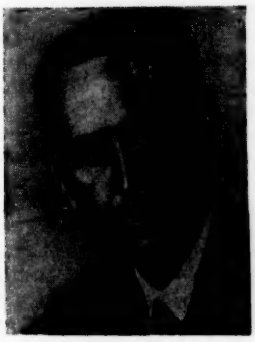
Harry Foster, Cincinnati, Ohio
James H. Kuehn, Milwaukee, Wisc.
William A. Sizer, Chicago, Ill.
Gilbert L. Stecker, Louisville, Ky.
Horace W. Wilson, Philadelphia, Pa.
Millard W. Young, San Francisco, Calif.

Terms Expiring 1959

C. A. Bowen, Nashville, Tenn.
Jules L. Gagini, Omaha, Nebr.
J. R. Goodfellow, Seattle, Washington
Stanley C. Hoffberger, Baltimore, Md.
Wm. E. Martin, Vancouver, B. C. Canada
Harlan J. Nissen, Los Angeles, Calif.
Garth A. Shoemaker, Elmira, N.Y.



Dr. S. C. Prescott
Chairman of Board



Harlon J. Nissen
President

Dr. H. C. Diehl
Director

Roy M. Hagen
First President

Today, he said, the emphasis is on frozen storage of baked goods and their marketing in a frozen condition. Also current projects of importance are dew point condensation in the packaging of nuts and candies. Even flying instruments and guided missiles have had some incidental item which required research or stimulation of research by the Foundation.

According to the speaker, the Foundation opened the door for such projects with cash grants. Industry magnificently manifolded them into their present day importance. Therefore, he reasoned that it may well be worth a million to the industry for the Foundation and refrigerated warehousemen to embark on projects in food technology and selling practices for the cold storage field. He implied that such industry research could provide the instruments and training for professional performances which would elevate selling practices in today and tomorrow's more competitive market.

Selling Practices

Following Hagen's remarks, Research Director Diehl asked that his assistant, Wm. C. Hoover, explain one of the present projects of the Foundation with regard to professional selling practices. Hoover directed attention to some "selling aids" exhibited. These "Memos for Salesmen" summarize research projects of the past few years which pointed to cooler storage potential in dried fruits, peanuts, tree nuts (peanuts, walnuts, almonds, filberts, cashews and chestnuts) and candies.

Altho industry research has proven that refrigerated storage provides a leveling of marketing and more orderly processing of food products, these products and their industry have not shown increased storage of these commodities consistent with what could be stored from present production. Hoover pointed out that "Memos" on each commodity sum up selling benefits which a professional space salesperson in the refrigerated warehouse could well use in attracting more products for storage. He indicated this was a practical item the Foundation will continue to provide to warehousemen.

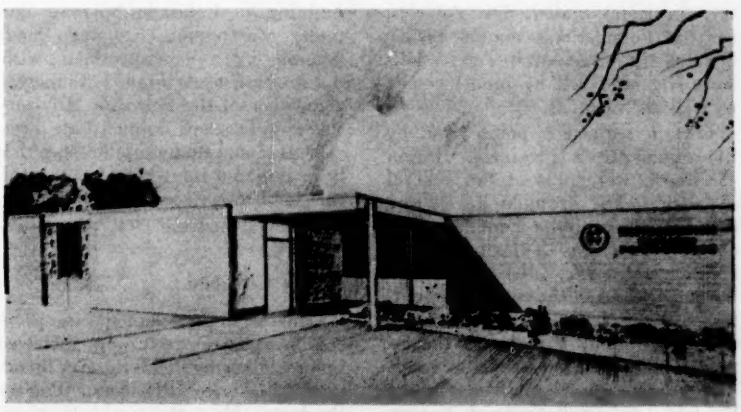
Prescott Addresses Meeting

Dr. Samuel Cate Prescott, as Chairman, TRRF's Board of Directors, reviewed the progress of the Foundation in his remarks. He defined industry research as compared with "pure" research of science. Referring to himself as "an onlooker" due to his unique position of being one of the public members of the Board, he indicated that both the American public and industry have come to look on research with respect, sympathy and generosity. TRRF and its sponsor industry, refrigerated warehousing, is no exception. Dr. Prescott reviewed 150 years history of foods and biologics, machinery and today's industry Research and implied that such research and the Foundation were in their infancy.

Director Diehl in his report, emphasized the cooperative efforts of colleges, universities, government and private groups in concluding successful research projects pointed out by the previous speakers. For this age and the future, he refused to use the term optimistic, preferring the adjective dynamic for descriptive purpose. Research of the nature sponsored by the Foundation is typical of a dynamic age, he said and based on fact whereas optimism could fall short of dynamic inspirations.

Record of Progress

President Nissen confined his meeting remarks to the record of progress of the Foundation also. He pointed out the respected position of the Foundation and its influence or braking effect on ill trends. Specifically he referred to legislation proposals in some states regarding frozen food distribution and use. Findings and recommended practices of the Foundation deterred the adop-



New headquarters of The Refrigeration Research Foundation under construction at 12 North Meade Avenue, Colorado Springs, Colorado. This building, which will house invaluable research publications and records, in addition to offices, has been made possible by a generous loan, without interest, of $50,000 by Mr. William J. Finnegan. TRRF Annual Report, 1955.

tion of ill advised statutes such as hampered the growth of industry in other fields.

Wm. J. Finnegan was cited by President Nissen for his generous loan, without interest, of $50,000 for use in construction of a headquarters for the Research Foundation. This building under construction at 12 North Meade Avenue, Colorado Springs, Colorado will house research publications and records, in addition to the research offices. It is hoped that the Foundation headquarters will develop into an archives for refrigeration research publications, a project needed by the American refrigerating industry.

Prescott Fellowship Award

Announcement was made at the membership meeting of the winner of the Samuel Cate Prescott Fellowship Award. This award established last year by the Foundation was presented for the first time to Lawrence S. Spiegel of MIT. Dr. Wm. A. Schoenfeld, Chairman of the Fellowship Award Committee made the announcement.

Mr. Spiegel has been a graduate student at MIT since September, 1953. He has passed written and oral examinations for the doctorate degree and is ready to undertake doctoral research. He previously worked on a bread-freezing project and his further research will include freezing preservation of foods in conjunction with newer processing methods, including radiation and high-frequency heating.

Members of the Committee who aided Dean Schoenfeld in making the first award were Cliff D. Carpenter, president of Institute of American Poultry Industries; Herbert Farnsworth, Quincy Market Warehouse and Cold Storage Co., Boston; William Giacomazzi, Jr., Modern Ice and Cold Storage Co., San Jose, Calif.; Prof. Carl F. Kayan, Columbia University, New York City; W. T. Pentzer, U. S. Department of Agriculture; and Horace W. Wilson, Quaker City Cold Storage Co., Philadelphia.

Dr. Schoenfeld also reported on European contacts established by the Foundation. He recently completed his second trip to Europe in a period of two years. His report indicated much refrigeration progress in European countries. He related that in two years time he has found home refrigerators now offered for sale thru appliance stores. On his previous visits this was not heard of. He indicated that these stores offering such merchandise for sale on the continent will also arrange for the customers to make the purchase with only 10 per cent down and two years to pay the balance. According to the Doctor this aspect was very encouraging.

He also cautioned that we should not under-estimate Russia's interest in refrigeration research and in redevelopment of war damaged areas. From reports at the International Congress, and other sources, it appeared that perhaps this Nation had shown the most progress among industrial refrigerating rather than domestic lines. Schoenfeld was much surprised at the change of European attitudes concerning cooperative groups or associations. Schooled in cartels and monopolies, it was estimated that European nations would be slow to see the benefits of exchanging ideas and information thru societies and educational groups.

This speaker reported that he even found evidence of supermarkets and the distribution of frozen foods thru the equivalent of U.S. chain store marketing or frozen food plans. Many modern buildings have been erected as part of the war rehabilitation program in the two years between his visits. Most of these improvements took place in England, Belgium, The Netherlands, Germany, and Switzerland. Some improvements were noted in Austria, Italy and France but not in the same degree as among the north and middle European countries.

TRRF's Scientific Leaders Meet in Four Sessions

ON SATURDAY, April 7, morning and afternoon, on Sunday afternoon, and again on Monday April 9, the Scientific Advisory Council and project leaders of The Refrigeration Research Foundation met in Hotel Statler, Los Angeles, for the Foundation's annual review of refrigeration research. The sessions were well attended by industry men as well as scientists.

Certain sequences, pointed out by the Foundation's President, Harlan J. Nissen, were part of the general discussion. For example he showed that the work of the Foundation in earlier years was a factor in the creation and work of the USDA Cold Storage Research Advisory Committee, and the work of this committee was undoubtedly a factor in the establishment of the temperature-tolerance studies on frozen foods in the Western Utilization Research Branch of USDA, and that these studies are now extremely timely and valuable in the development of governmental regulations in the handling of frozen foods.

In general discussion Director H. C. Diehl reported that the Foundation's position, as a research agency, financially, and otherwise, is on the whole stronger than at any time in its 14 years. The new headquarters building in Colorado Springs, now under construction, has been made possible by a generous loan, without interest, by William J. Finnegan, a member of the Scientific Advisory Council. The new Samuel Cate Prescott graduate-student fellowship has been initiated this year. Aid to projects and other services have continued at a somewhat stepped-up rate.

Fields Covered

General progress and specific progress in aided projects were reviewed in the following fields: Dairy Products; Fisheries Products; Poultry Products; Meat Products; Horticultural Products Including Nursery and Floricultural; Radiation of Foods; General Including Candies, Baked Goods, Canned Foods, Rations; Frozen Foods Including Prepared, Temperature Tolerance, and Legislation; Packaging; Engineering; and Cold Storage Research Advisory Committee.

Increasing attention in these discussions from year to year centers on uses of research findings in warehouse operations. This subject is considered at length in Director Diehl's annual report — a 42-page printed review of work in 1955 — which was distributed at all meetings in Los Angeles. Another new development is Memos to Salesmen, which are prepared especially to show applications of research results. Several of these have been prepared (on candies, peanuts, dried fruit) and others are in the planning stage.

Highlights of the discussions are reported below, with technical details omitted. Many of the applications and specific practices were discussed by industry men and the scientists at some length.

Dairy products research was comprehensively reviewed by Dr. Walter V. Price, University of Wisconsin, who pointed out that the next few

years may see interesting developments in the distribution of non-frozen concentrated milk packed in sealed containers. Research in this direction is under way in a number of research organizations and the evaporated-milk industry is of course very much interested. Such product would require refrigeration at temperature slightly above freezing.

The project on cheese mites at University of Wisconsin is continuing, but no longer aided by TRRF. This work proved highly valuable in recent developments in the processing and packaging of cheese. The butter industry is interested in increasing the "spreadability" of its product and research is under way on that objective. A high-quality whole milk powder could be developed with refrigeration, if concern for condensation could be dispelled. This and other points raised suggested the possibility for new services in warehouses related to control of condensation.

Fisheries products were reviewed by Otto C. Young, E. A. Fieger, Donald K. Tressler, and Kathryn L. Osterhaug, all of whom are either members of the Council or engaged in aided projects. Mr. Young described work by Fisheries Research Board in Canada on basic factors in quality. Dr. Fieger described some of his recent work on preservation of quality in freshly caught shrimp, including prevention of the "black spot" trouble. Miss Osterhaug reviewed work on TRRF-aided researches on lake fish and Pacific oysters — conducted by U. S. Fish and Wildlife Service. Mr. Young reported that laboratory tests on brine or sea-water cooling look very promising. Use of aureomycin or "Acronizing" likewise looks as if it will be an important factor in the near future. Dr. Fieger also reported some work on Gulf oysters.

In the discussions on poultry problems attention centered on work reported by Hans Lineweaver on means of providing as much tenderness in frozen poultry as is possible under modern processing conditions. This problem is under investigation by Dr. Lineweaver and his associates at USDA's Western Utilization Research Branch in Albany, Calif. These workers have attempted to learn the minimum amount of chill holding prior to freezing that will produce the optimum tenderness and to evaluate other factors such as beating in picking machines, scald temperatures, and cooking without thawing as factors in tenderness. A progress report on these studies will be published.

Discussion of meats centered on water glazing. The Foundation will supply some information on this subject to members within a short time —based on industry practices. Frozen consumer packages of meats of course are a very important matter at present but were not discussed at length.

Orange Juice Research

Temperature tolerance researches on frozen concentrated orange juice were described by E. A. Beavens and Robert McColloch of the Pasadena laboratory of the Western Utilization Research Branch of USDA — particularly the mechanism of cloud loss as related to storage temperature, which is the most important factor. E. M. Harvey discussed studies on fresh lemons in recent years. Leonard Rygg presented results on storage of dates. These are TRRF-aided projects. Since the Foundation is now actively interested in storage of nursery and floricultural products much attention was given to these products.

E. P. Christopher of Rhode Island Agricultural Experiment Station was present to obtain preliminary information and to consult with research and industrial people in California on this subject. M. H. Kimball of University of California was present to describe some of the extensive developments that have taken place in recent years. Cold storage is now being used to some extent for rose bushes, and cut roses, carnations and mums are being cold stored to some extent.

The more recent developments in a project on storage atmospheres were discussed by Dr. Milton Workman of Purdue University. This project has stimulated a great deal of related research at Purdue on products other than horticultural crops. It seems possible that sealed liners may have some influence on scald of apples held in storage. This project has proved to be very timely — particularly because so much interest has developed in atmosphere control in packaging and in the discovery of the components of volatiles and their specific effects on quality.

J. G. Woodroof of Georgia Agricultural Experiment Station has conducted elaborate studies on nuts and candies with TRRF and other industrial assistance. He remarked that many still believe that freezing is injurious to nuts and candies — and that efforts to correct such misconceptions are very important. During the recent drought, he said, large quantities of nuts that had been stored for two years were used with perfect success.

Prof. Frank Allen of University of California said that walnuts frozen on the tree will turn rancid quickly and Dr. Woodroof remarked that peanuts frozen with high moisture content are ruined but after they are processed and ready for sale they can be frozen with marked benefit to keeping quality. He observed that when nuts are shelled they are moistened to aid in shell removal and that this moisture must be removed. Services that warehouses can render include control of moisture content through control of temperature and relative humidity.

The problem of cooling in cartons was discussed briefly by Frank Allen of University of California and J. R. McRill of Sunkist Growers. Tests are under way indicating that it is possible to cool fruits with air when it is packed in cartons provided with apertures to permit air movement; however, the problem is not a simple one.

E. F. Jansen of Western Utilization Research Branch of USDA reported at length on the comprehensive temperature-tolerance studies on fruits and W. F. Talburt discussed the studies on vegetables in the same general project. Mr. Jansen also discussed studies on a method for taking temperature in a container without damage to packages of product. The method requires only a few minutes and is accurate. The temperature-tolerance studies will be published as results become available.

The Foundation-sponsored studies on freezing of baked goods were reported at length by James W. Pence of Western Utilization Research Branch. These studies have attracted wide attention. Engineering projects discussed included the study on water quality, by R. M. Westcott of Holladay & Westcott, Los Angeles; enthalpies of frozen foods, by M. Steinberg of University of Illinois; frosting of coils, by W. F. Stoecker, University of Illinois; one on condensation and one on heat transfer, by Carl F. Kayan of Columbia University.

Prof. Steinberg also discussed the new project at University of Illinois on effect of low levels of irradiation on the storage life of refrigerated foods. The Foundation has felt it necessary that such work be undertaken as soon as possible. The project will involve use of cobalt-60 as the radiation source, as presently planned, and chickens will be the first food used. The University of Michigan will cooperate.

Standards For Identification of Piping Systems

THE American Standards Association has issued ASA A13.1-1956 standard for the identification of piping systems which standard was sponsored by the National Safety Council and The American Society of Mechanical Engineers. The American Standard scheme for the identification of piping systems was originally affirmed in 1928 and reaffirmed in 1945. Preliminary report of this method of color coding appeared in INDUSTRIAL REFRIGERATION, Page 47, July 1955.

For the purpose of identification, the standard includes in addition to pipes of any kind, fittings, valves and pipe coverings. This classification includes sprinkler systems and fire-fighting or fire protection equipment. The identification for this group of materials may also be used to identify or locate such equipment as alarm boxes, extinguishers, fire blankets, fire doors, hose connections, hydrants and other fire fighting equipment.

Positive identification of a piping system content is recommended by a lettered legend, giving the name of the content in full or abbreviated form. Arrows may indicate direction of flow.

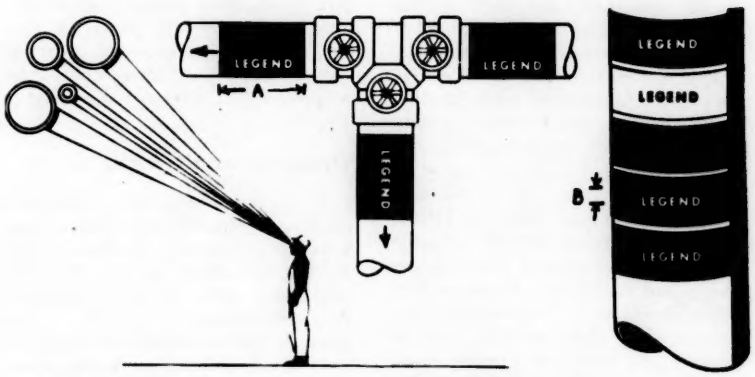
Examples of legend to give both positive identification and supplementary information as regards hazards or use are:

Water — Fire protection
Ammonia — Anhydrous — Dangerous liquid and gas
Acetone — Extremely flammable liquid
Hydrogen — Extremely flammable gas
Air — High-pressure gas
Carbon Dioxide — Fire protection

When color, applied to the entire piping system or as colored bands is used to give supplementary information, it shall conform to the tabulation shown below.

Fig. 1 shows the four main classification color bands, color of the legend letters and their suggested placement location, also the recommended width of color bank "A" together with the size of the legend letters "B" for various pipe diameters.

CLASSIFICATION	PREDOMINANT COLOR
F — Fire-protection equipment	Red
D — Dangerous materials	Yellow (or orange)
S — Safe materials	Green (or the achromatic colors: white, black, gray or aluminum)
and when required,	
P — Protective materials	Bright blue



Key to Classification of Predominant Colors for Bands		*Color of Letters for Legends*
F—Fire protection	*Red*	*White*
D—Dangerous	*Yellow*	*Black*
S—Safe	*Green*	*Black*
P—Protective	*Blue*	*White*

Outside Diameter of Pipe or Covering	*Width of Color Band A*	*Size of Legend Letters B*
¾ to 1¼	8	½
1½ to 2	8	¾
2½ to 6	12	1¼
8 to 10	24	2½
Over 10	32	3½

All dimensions are given in inches.

ASA Standard Key to Classification Color of Bands—Color of Legend Letters—Legend Placement-Width of Color Bands and Size of Letters for Various Diameter Pipes

Color bands, if used, shall be painted or applied on the pipes to designate to which of the four main classifications its contents belongs. The bands should be installed at frequent intervals on straight pipe runs (sufficient to clearly identify) close to all valves, and adjacent to all change-in-directions, or where pipes pass through walls or floors. The color identification may be accomplished by the use of decals or plastic bands which are made to conform with the standards. If desired the entire length of the piping system may be painted the main classification color.

Attention has been given to visibility with reference to pipe markings. Where pipe lines are located some distance above the normal line of the operator's vision, the lettering should be placed below the horizontal center line of the pipe as shown in Fig. 1.

In certain types of plants, it may be desirable to label the pipes at junction points or points of distribution only while at other locations, the markings may be installed at necessary intervals all along the piping, close to valves and adjacent to change-in-directions. In any case, the number and location of identification markers should be based on judgment for each particular system of piping.

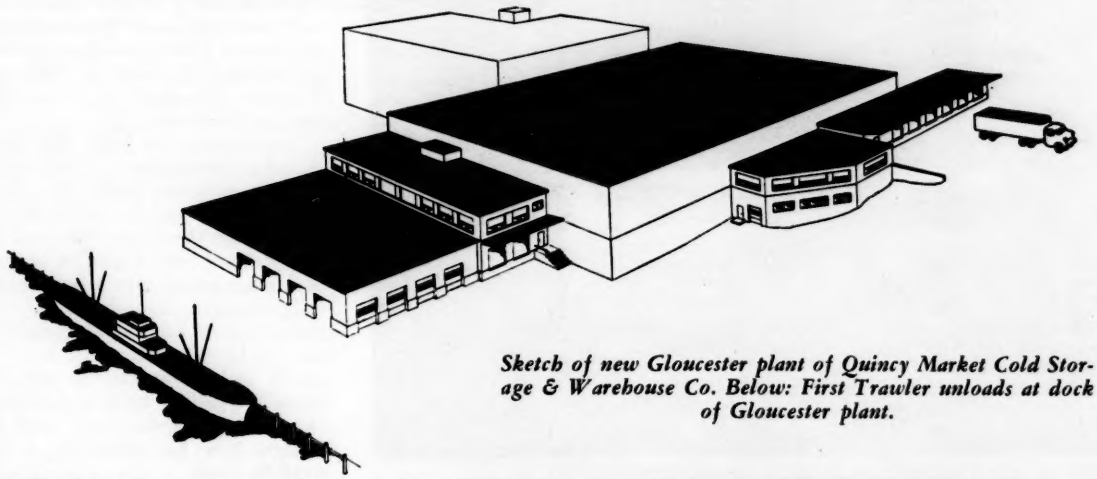
Regarding the type and size of letters, the use of stencils of standard sizes ranging in height from ½ in. to 3½ in. is recommended. For identification of pipe less than ¾ in. in diameter, the use of a tag is recommended. The lettering or the background may be of the standard color. (See Fig. 1).

In cases where it is decided to paint the entire piping, the color and sizes of legend letters stencilled on the piping for identification of material conveyed should conform to the specifications shown in Fig. 1.

Dairy Expansion Program

A $70,000 expansion program has been announced by the South Okanagan Dairy Industries' Co-operative association at its Vernon, Wash., plant. The program will include enlargement of cold storage rooms, re-arrangements of buildings and installation of new equipment. Expansion is made necessary because of the rapid increase in dairy sales.

Warehouse Services Water Front



Sketch of new Gloucester plant of Quincy Market Cold Storage & Warehouse Co. Below: First Trawler unloads at dock of Gloucester plant.

SAID TO BE the most modern structure in Gloucester, Mass. is the new refrigerated warehouse of the Quincy Market Cold Storage and Warehouse Co. of Boston. The new warehouse is designated as the Gloucester division of the company.

Gloucester, a city of 30,000 population is rich in fishing lore and early American history. It is the leading east coast fishing port, producing a substantial proportion of fresh, frozen and processed sea food products that find their way to markets throughout the country.

The warehouse has approximately a million cubic feet of space with a storage capacity of 12 to 14 million pounds. It is designed to maintain temperatures of minus five degrees.

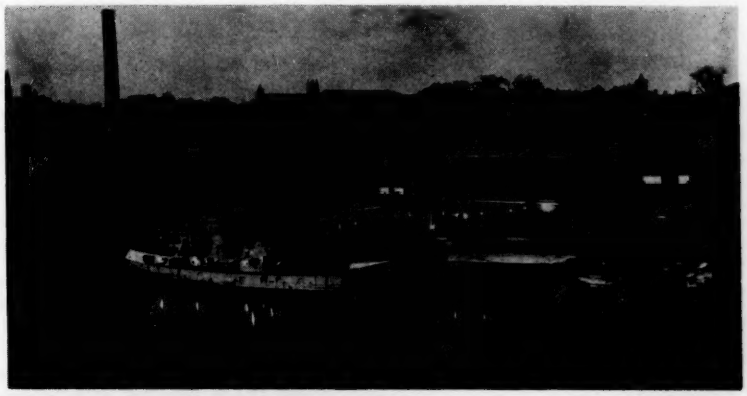
The plant is strategically located on waterfront property of 131,000 square feet. The main two-story reinforced concrete and brick storage building is 204 feet long by 162 feet wide with a total storage area of about 64,000 square feet.

The first floor has a stacking height of 11 feet 6 inches, the second 17 feet, and both floors can receive and ship directly to trucks. The front or eastern side of the building has six doors, the rear seven doors.

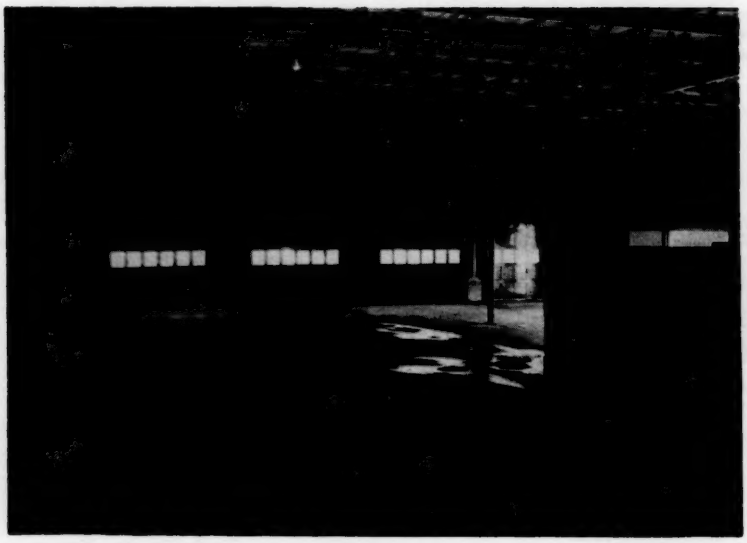
Initially, mechanical handling equipment will consist of 6 electric fork trucks of 3000 lb. capacity, two of which are of the high stacking type. A total of about 6000 pallets 48 inches by 40 inches will be used.

Three 10,000 lb. capacity hydraulic elevators have been installed with provision for a fourth to provide the inter-floor movement.

Six fully automatic motor generator battery chargers will be used to keep the batteries at top performance.



Refrigerated room of new Gloucester, Mass. Division of Quincy Market Cold Storage and Warehouse Co., Boston.



Dry Cargo shed of Quincy Market Cold Storage and Warehouse Co. at Gloucester, Mass.

Insulation

Insulation consists of 17 inch "Perlite" concrete on the first floor, 8 inch "Fiberglas" on the walls, and 10 inch "Foamglas" on the roof which is designed to be kept flooded at all times.

Special low temperature fluorescent lighting, automatic door opening devices, automatic fire and burglar alarm system have been installed for maximum efficiency and protection.

There is a 22 foot minimum depth of water in the dock alongside a 300 foot wharf.

An unrefrigerated shed of 6000 square feet floor area and several air conditioned offices complete the construction project.

Engine Room Equipment

Ammonia compressors produce minus 30 F refrigeration for freezing, also minus 5 F to minus 10 F temperatures in storage areas Equipment includes 4 rotary booster compressors equipped with 60 hp. motors, 1 six cylinder reciprocating booster compressor equipped with 40 hp. motor and 3 - 10 x 10 reciprocating second stage compressors equipped with 125 hp. motors.

Brine coolers and pumps are multiple units to provide the greatest economy, flexibility, and standby protection in circulating calcium chloride brine throughout 86,000 feet of 2 inch pipe coils (roughly 16 miles) to maintain constant low temperatures and high relative humidities.

Protective devices include a completely integrated electrical control for fully automatic operation of engine room equipment. Protective devices shut down any or all equipment that may be in trouble, give a "telltale" signal as to the cause and send in an alarm through the A.D.T. alarm system which operates around the clock.

Defrosting

Warm brine defrosting equipment consisting of heat exchangers, pumps and piping enable defrosting of any pipe coil in the warehouse in a matter of minutes.

Temperature Indicators provide Engine Room operator at a glance an accurate reading of temperatures in various sections of the warehouse as well as in the sub soil below the First Floor.

Pipe and low temperature vessels are insulated with Foam-Glas.

Sub-soil protection against freezing is provided by heat exchangers, pumps, etc., which circulate a warm antifreeze solution through coils installed under the warehouse floor. The solution is heated by heat available from the compressors.

Butter Converted to Oil

THE UNITED States Dept. of Agriculture has granted awards to convert 24 million pounds of butter to butter oil for foreign donation. When the butter is converted to oil and delivered under contract, USDA will have donated for foreign use the butter oil converted from nearly 150 million pounds of CCC-owned butter. In addition, 216 million pounds of butter have been donated for foreign welfare use. Donations for domestic uses amount to 318 million pounds.

New Pallet Repair Manual

THE MOST economical methods of repairing wooden pallets used with materials handling equipment in the Armed Forces has been released to industry through the Office of Technical Services, U. S. Department of Commerce.

Prepared by the Navy, the report includes information on the 48 by 72 inch stevedore pallet, the 48 by 48 inch pallet and the 40 by 48 inch pallet, both the block type and the four stringer type. Examples of types of damage which cannot be economically repaired are illustrated. Also included is a method of converting the 48 by 48 inch pallet to a 40 by 48 inch pallet for use with the straddle type fork truck and methods of cutting the block type and the stringer type for adaptation to the straddle truck.

Repair and modification techniques recommended in the manual are based upon a study of the methods employed at the Naval Supply Depot, Bayonne, N. J., and the Naval Supply Center, Norfolk, Va.

The report is PB 111755 *Pallet Repair Manual*, H. A. Rothe and M. Toscano, Naval Supply and Development Facility, Bayonne, N. J., Apr. 1955, 34 pages.

Storage Plant Adds Space

AN ADDITION to the zero storage plant of the Market Wholesale Grocery Company is being rushed to completion in Fresno, Calif., so as to be ready to handle the June berry crop. Nineteen thousand square feet of space will be added to the plant in this new project at a cost of approximately $250,000. It was designed and is being constructed by the William J. Moran Company, consulting engineers and general contractors of Alhambra, Calif.

The Market Wholesale Grocery Company, with hearquarters in Los Angeles, was founded in that city in 1925. It now has branches in Fresno, Redwood City, Santa Rosa, Modesto and Sacramento. There is another large storage plant in Glendale.

Fire Destroys Ice Plant

FIRE of undetermined origin, but believed to have been caused by defective electric wiring, destroyed the Hainings ice manufacturing and storage plant, Colby, Kans. A 3-hour battle by the fire department saved adjacent buildings.

Garment Boxes for Storage of Clothing Builds Business for Storage Houses

BACK in the late thirties most cold storage and ice companies were casting around for products to store other than food stuffs. The ice business being what it was, and with all the little pigs killed off, management was looking for a "life saver" so to speak. The U. S. Cold Storage Company's, president, E. M. Dodds, entertained an idea about fur storage, which had been developing through members of the American Institute of Refrigeration. So when Jack Gregory, a department store trained man, came along looking for proper facilities for cold storage of furs it did not take too long to work out an arrangement for a fur and fabric storage department.

What started out as a "Wholesale" venture, developed into a wholesale and retail fur storage operation. The first year was somewhat of a disappointment, but did show possibilities for profitable volume. During the season for solicitation for fur storage, Mr. Gregory talked with many housewives and learned that while the housewife recognized the necessity of preserving the value of her fur garment, she was more interested in proper care of her family's woolens as, generally they represented a greater value (in the aggregate, husband's suits, top coats, her good woolen suits and dresses and children's snow suits, etc.) and with insufficient closet space in their then, modern home. Mr. Gregory and Herb Trask, U. S. Cold Storage Company's, general manager, got their heads together to work out a "box" idea, which they offered their prospective customers in 1938.

Standardized Boxes Designed for Holding Clothing in Cold Storage

Conglomeration of Boxes

They sold 53 women on the idea that year, and what a conglomeration of boxes, most any size including a few suit cases! Both Gregory and Trask realized that would not do, the size had to be standardized, it had to be big enough to give fair value to the customer, and still return a profit on the space it was to occupy. The box they sold in 1939 to the 492 women was still a little too large. When packed full of clothing it almost was more than a man could easily handle (bulk not weight). So in 1940 they cut the size down somewhat and found it acceptable to their customers, easier to handle, store and deliver. That year, they sold 1,269 (some customers used more than one box) and the following year, 1941, they sold 1,327 boxes.

This was the capacity of the space being used for the storage of boxes (in their fur vaults under the coat racks). In 1942, another vault was taken over for fur storage. Racks were built for fur coat hanging in one-half of the room, the other half for box storage. The sales jumped to 2,589 boxes, and the next year to 3,265. The boxes were stacked one on top of the other, 5 to 7 high. This was capacity for the space available. The labor rate had risen from 35 cents per hour in 1937 to $1.00 plus in 1944 and a way was sought to reduce the handling costs.

In the spring, 1946, after the war, they were able to get steel to build racks to hold the boxes, an additional room was fitted with racks to properly store about 6,000 boxes, and the sales jumped from 3,265 to 4,370 and to 5,972 in 1947. The racks were built to hold 11 boxes (high) but the 11th box was 3 inches higher than the sprinkler head and this reduced the capacity of the room from 6,000 to about 5,400 boxes. Capacity has been reached every year since, and since 1951 not a cent has been spent on advertising!

Good Public Relations

In 1937, a few department stores and cleaners and practically none of the consuming public (housewives) had ever heard of the U. S. Cold Storage Co., which is located on the most traveled bridge across the Missouri River, with four foot gold letters across the 200 foot front of the building. It did have a brick faced water tower with a huge revolving mirrored ball on its top, so Gregory had his telephone solicitors tell the prospect, who had never heard of the

U. S. Cold Storage Co. "you have seen the big red brick building at the south end of the A.S.B. Bridge with the big ball on the top"? The answer was almost invariably "oh yes". After recognition, and establishment of the fact that the department was under competent management, the sale was easy enough. Today, there are very few residents of Kansas City, and its suburbs that do not know the U. S. Cold Storage Co. well and favorably!

In 1938, Mr. Gregory, realized that dry cleaners, or others, would learn of the hearty acceptance of the local trade for the box and cut in on his promotions; so he went in consultation with his advertising agency, and came up with the name *VITAFIED* Safe Deposit Garment Box.* It was trade-marked and copyrighted and Gregory has made the box available to all operators of Certified Cold Fur Storage Vaults. Some, who started out with 100 boxes are, now, storing several hundred after just two seasons. Gregory, who is the secretary-treasurer of the Certified Cold Fur Storage Association, and owner of the trade-mark and copyright of the Vitafied Storage Box, has a complete promotional plan available with ad-mats, folders, door knob hangers, and consumer instruction for properly packing the box so that misunderstandings are avoided, and good public relationship with his customers assured.

Refrigeration and Humidity Control

We asked him about how one could start the box business using his boxes, promotional plan, etc., and about the cost so that one's efforts would not be wasted by chiseling competition. He said "the first and most important thing naturally, is proper refrigeration and humidity control. The temperature can be anywhere below 40 F, and above 10 F; he prefers 28 F, and maintains that temperature with humidity around 45 percent, never more than 55 percent, and to handle his boxes the vault must be Certified, explaining that the moral obligation of the firm to maintain proper temperatures and humidity were most important for the very simple fact that moth, or insect eggs will hatch and the larvae continue to eat and grow at temperatures slightly higher than 40 F., and mildew, or oxidization could take place if the humidity was not controlled at the proper percentage.

Getting back to the cost of going into the clothing storage business, Mr. Gregory stated that the cost was practically nil, if refrigeration and space were already available. A couple of hundred dollars for boxes, plus the cost of advertising and promotion, which would, of course, be determined by the amount of space available for that type storage, the market to be reached, and other factors. He strongly recommended, newspaper, or radio announcements of the new service with complete reliable and reasonable information to the consumer, with a telephone call to the prospect followed by an explanatory direct mail folder, if unable to get an order over the telephone.

He explained that women appreciate being relieved of the obligation and worry of "sunning", "brushing" and "moth balling" the winter garments, to say nothing of having more space to work around them in the closets with insufficient closet space for the summer wardrobes. (About 15 to 20 percent of his boxes are repacked with summer garments and stored during the winter — October to May, at regular price.) They would demand the service the next year, and probably use more than one box. An analysis of his alphabetical customers' list showed that most of his Vitafied Storage Box Customers stored their fur coats, and at least their husband's best overcoat on hangers in addition to the boxes. He does not permit, or recommend storage of furs in boxes, as furs need cool circulating air for best preservation. Moth balls, or other odoriferous insecticides are not needed.

Livestock Responds to Air Conditioning

IT MAY be cold around the barn at morning milking time these days, but summer heat isn't far off. And when those hot days come, they take their toll in decreased milk production, lower gains in the feedlot, fewer eggs, and particularly in a drop in breeding efficiency.

While the day of air conditioning in barns, farrowing houses, laying houses and other livestock buildings is just dawning, experiments with stock kept at varying temperatures seem to indicate that an investment in "comfort cooling" equipment might pay dividends in many areas.

At the University of Missouri's "climate laboratory," for instance, it was found that cows produce better at 50 to 60 F than at higher temperatures. Holsteins were found to consume less feed and consequently go into a production slump when temperatures hit the 75- to 80-degree range. Jerseys were affected similarly at 80 to 85 degrees. This difference was explained because heat dissipation is largely by body surface. Holsteins, with less body surface per unit of weight than the lighter Jerseys, could not stand high temperatures quite so well.

During an 80-day test at a California experiment station, beef cattle sprayed with water to provide evaporative cooling gained 1.45 pounds per day, compared with 1.23 pounds gain daily for unsprayed cattle on the same ration. Hogs weighing between 166 and 260 pounds gained most rapidly when the temperature was 60 degrees.

Egg Production Increased

In a Maryland test with laying birds, lowering the temperature and humidity was really found to pay off. At a temperature of 83 degrees and 81 per cent relative humidity, the chickens laid at a 36 per cent rate and eggs weighed 16.8 ounces a dozen. But when the temperature stood at a frigid 36 degrees, and relative humidity at 75 per cent, egg production went to 70 per cent with a weight of 24 ounces per dozen.

A commercial installation of a "heat pump" which automatically heats, cools, dehumidifies, and ventilates, is reported to be producing considerable savings in the hog farrowing operation at Conner Prairie Farms, near Indianapolis.

Tillman Bubenzer, farm manager, and Don H. Fisher, in charge of swine production, make a number of observations regarding the advantages of the "heat pump." They credit it with greatly increased swine production, lower initial investment and operational costs, reduced fire hazards, a drop in pig injuries during the first two weeks after birth, less disease because there are no drafts, fewer flies and other insects.

Sheep, too, seem to respond to proper temperature control. At a Kentucky experiment station, only 26 per cent of the Southdown ewes were settled when bred in late August to rams handled in the normal manner. But when rams were housed in air-conditioned stalls maintained between 45 and 48 degrees, the breeding efficiency jumped to 64 per cent.

While these experiences stem from a relatively few experimental applications of air conditioning in the field of livestock housing, the results seem so promising that refrigeration engineers are hailing this practice as the next major contribution of technology to the American farm scene.

Practical Refrigerating Engineer

NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS

UL Facilities For Testing Refrigeration Equipment

W. A. FARQUHAR
Associate Engr.
Casualty & Automotive Dept.
Underwriters Laboratories, Inc.

ABOUT TWO years ago it became apparent that test facilities at Underwriters' Laboratories, Inc., were becoming inadequate to permit reasonably prompt testing of the refrigeration equipment and air conditioners which were being submitted for listing. The main reason was the tremendous upswing in the submittals of room air conditioners and residential air conditioners of the central type.

In April 1954, after making a study to determine what was needed, invitations for bids to build "Hot Rooms" were extended and the Laboratory now has in operation three rooms with automatically controlled and recorded conditions, equipped with remote instrumentation of the samples under test. These rooms are arranged and equipped for conducting both single and dual ambient air-to-air tests as well as air-to-water and water-to-water tests.

In addition to "Hot Rooms", Underwriters' Laboratories, Inc. has increased its facilities for conducting locker-rotor tests on refrigeration motors, obtained new equipment for making hydrostatic strength tests, and constructed rain test equipment.

Since the "Hot Rooms" are the most imposing part of Underwriters' new laboratory, and more closely approach industrial refrigeration applications, they are described first:

Three rooms occupy a rectangle approximately 43 x 13 ft. and are arranged along one side wall of the 50 x 100 ft. laboratory. The two end rooms are 12 x 12 ft. and the center room is 12 x 18 ft. Ceilings in all rooms are 9 ft. high and the doors are 4 x 8 ft., thus permitting the testing of large equipment. Common walls between adjacent rooms are each pierced with two openings. The openings in one of the walls are 3 ft. wide by 2-½ ft. high and those in the other are 3 ft. wide by 5 ft. high. These openings are provided to permit dual ambient testing and to permit combining the capacities of adjacent rooms when necessary to test equipment which presents a load too large for one room. Removable insulated plugs are provided to isolate the rooms from each other.

The rooms are constructed on a 3-in. thick slab of concrete insulated from the 5-in. floor slab by 1 in. of compressed cork and reflective foil. The floor surface is troweled and surface-hardened.

Portable Type Construction

To permit subsequent removal of these facilities to Underwriters' Laboratories, Inc., Northbrook, Illinois location, the walls are made in panel sections with a nominal 4-in. thickness of Fiberglas thermal insulation. The exterior surface is electrogalvanized and painted steel cemented to marine plywood. The interior surface is stainless steel cemented to marine plywood. Joints between adjacent panels are rabbeted and secured by screws. The panels are placed between parallel angles secured to the floor by powder driven studs. A vapor seal is provided in all joints.

Ceiling sections are constructed and assembled in the same manner as the wall section. Entry of all electrical conduit and water piping is through removable plugs in the ceilings.

The end test rooms are provided with four and the center test room with six 100-watt surface mounted vaportight fluorescent fixtures.

Each test room is provided with an individual motor-operated damper exhausting into a common duct and then through a blower to a roof-mounted vent to permit exhausting the room in the event of a refrigerant leak or equipment fire.

Standard Test Conditions

The various Underwriters' Laboratories Standards for air conditioners and refrigeration equipment require test conditions of 104 F dry bulb, 80 F wet bulb; and 80 F dry bulb, 67 F wet bulb. Conditioning equipment is provided to maintain these conditions within limits of plus or minus 1 F. In addition, the conditioning equipment is designed to maintain 115 F dry bulb, 80 F wet bulb specified by the Air Conditioning & Refrigeration Institute for their maximum operating test and the 95 F dry bulb, 75 F wet bulb air to condenser and 80 F dry bulb, 67 F wet bulb air to evaporator specified as rating conditions by the American Society of Refrigeration Engineers. Tolerances for these latter conditions are also plus or minus 1 F.

All conditions in each room are capable of individual setting and are automatically maintained and recorded.

To condition the air in the rooms, a separate air-handling system with its associated heating, cooling, dehumidifying, and humidifying equipment is provided for each room. Electric heaters rated 12 kilowatts and 3-ton direct expansion evaporator coil are installed in each of the duct systems for the two end rooms. Electric heaters rated 24 kilowatts and a 5-ton direct expansion evaporator coil are installed in the duct system for the center room. Steam jets in the inlet air duct of each room provide humidification. A separate direct expansion low-temperature coil is provided in each duct system for use when dehumidification is necessary. Two recorder-controllers are used for each room. One of these controls and records dry bulb condi-

As an explanation of the UL. Inc. equipment applications for this specific field of testing, the Author repeated with minor changes for Chicago Chapter NAPRE members, a talk given before the AIEE Conference on Application of Motors to Heating & Cooling Equipment, St. Louis, Mo., Oct. 19 and 20, 1954.

EXECUTIVE OFFICE NAPRE
433 N. Waller Ave.,
Chicago 44, Ill.
OFFICERS
President: Leroy Etzel
Los Angeles, Calif.
Secretary, J. R. Kelahan, Chicago 44.

Operating engineers of all refrigerating plants are invited to affiliate with the National Association of Practical Refrigerating Engineers, Inc., an educational association, "not-for-profit".

tions while the other does the same for wet bulb conditions.

Record And Control Center

A three-section console, consisting of a center section and two wings, provides a centralized control, power supply, and data-taking station, and is located along one end of the three-room block. The three dry bulb and three wet bulb recorder-controllers for the rooms are located in the left wing of the console. This console and the test rooms are pictured in Fig. 1.

Individual 120/240-volt, single-phase, three-wire; 120/208-volt, three-phase, four-wire; and 240-volt, three-phase, three-wire circuits for supplying equipment under test are brought into the right wing of the console. From there they are distributed through a patch panel arrangement supplying the test stations in each of the rooms. A single test panel is provided in each of the end rooms and a test panel is provided on each common wall of the center room (see Fig. 2).

Induction regulators mounted in the right wing of the console (Fig. 1) are used to adjust the voltage of any of the circuits to the value required for test. Voltage and current consumed by any device under test can be measured at the main power supply panel, and a recording ammeter, which can be patched into any desired circuit, is provided on the right wing of the console to permit continuous observation of the input of any device under test. Because of the inherent inaccuracies in a meter of this kind, the recording ammeter is used only as an indicator.

Thermocouple Panel Appears As Jack Type Switch Board

All thermocouples from the individual rooms terminate in the center panel of the console. Again, a system of jacks and plugs are used to permit patching the thermocouples from any one of the four test panels in the rooms into either a recording potentiometer or an indicating potentiometer which are mounted on this same panel. A total of 80 thermocouples, 20 from each station in the test rooms are terminated on this panel. Plugs and receptacles are used to provide a quick and easy means of connecting test thermocouples to the power supply and metering panels.

For measuring pressures, a system of filled capillary tubes are used to connect between high- and low-pressure gauges mounted on the control panel and diaphragms mounted in the test stations in each of the rooms.

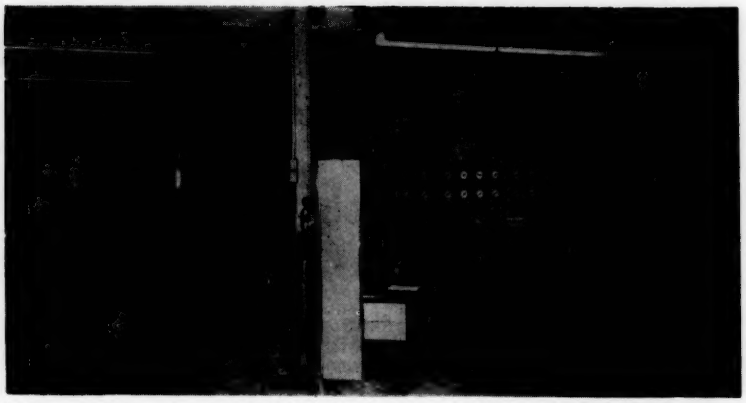


Fig. 1 — Nerve center for environmental test cells at Underwriters' Laboratories, Inc., Chicago, is this console instrument and control board. Each of the three sections performs a definite function in control and/or instrumentation of test facilities and equipment under test with regard to temperature, humidity and operating functions.

Two high-pressure gauges with a range of from zero to 1000 psig and two low-pressure gauges with a range of from 30 in. of mercury to 300 psig are terminated in each test station with a diaphragm to which the units under test can be connected by a short length of capillary tube. This system permits remote gauging with a minimum loss of refrigerant to the gauge line.

There is available in each room, in addition to the power supplied from the control panel, a liberal supply of 120-, 208-, and 240-volt power from the building supply mains. This power is used to run tools or any auxiliary loads necessary during the testing of an air conditioner or refrigerator.

A relatively small number of water-cooled air conditioners and other water-to-air or water-to-water units are tested in this laboratory. Consequently, Underwriters' Laboratories, Inc., considered it more economical to provide an instantaneous type water heater with a high recovery rate and a mixing arrangement to obtain the necessary 80 F entering water, than to provide a recirculating system and use the heat from the condenser of the device under test as a water heater.

Locked-Rotor Motor Testing

All compressor-motors and auxiliary motors employing inherent protection as well as all high-impedance protected motors are subjected to a locked-rotor test to determine whether the protector or the high impedance of the motor winding will prevent temperatures exceeding 150 C under locked-rotor conditions.

To facilitate this testing, Underwriters' Laboratories, Inc., provided three additional 100-amp circuits. These are a 120/240-volt, single-phase, three-wire circuit; a 240-volt, three-phase, three-wire circuit; and a 120/208-volt, three-phase, four-wire circuit. These three circuits provide adequate power for all present locked-rotor test needs.

Pressure and Rain Tests

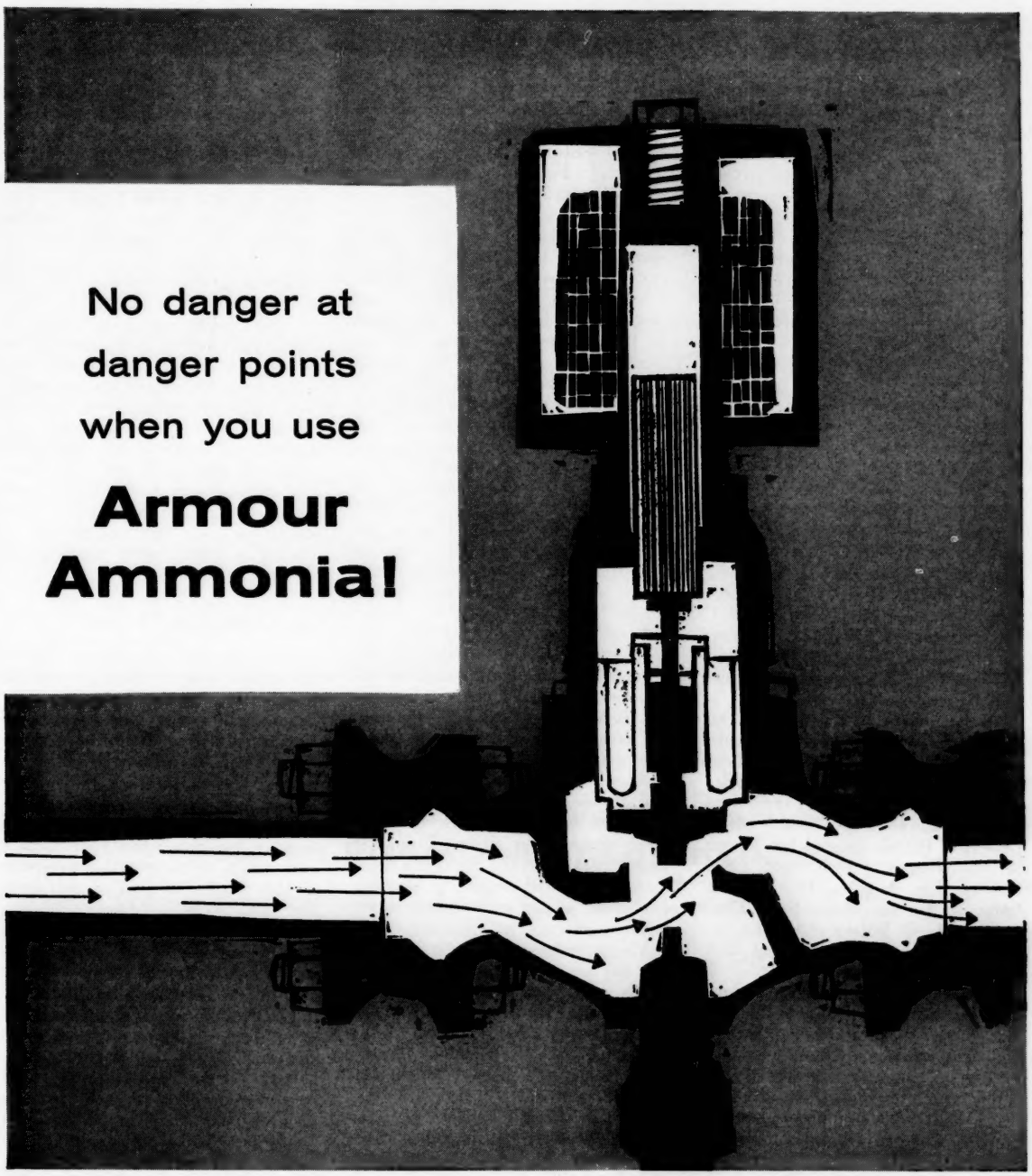
For hydrostatic testing, there have been installed two air-operated hydraulic pumps using water as the hydraulic medium. With 100 psig air to drive them, one of these pumps

(Continued on page 58)

Fig. 2 — Unit air conditioner being readied for maximum normal load test and subsequent rating label. Four of the leads supply three-phase, four-wire service, another thermocouple leads, and two capillaries to the control console. Note knock-out insulated plugs to the adjacent test cell for adding imposed loads.

No danger at
danger points
when you use

Armour Ammonia!



It's 99.98% pure, extremely dry and free of oil and non-condensable gases.

Frozen valves and other refrigeration system dangers such as corrosion, sludge and ice in evaporators can be caused by impure ammonia. They can result in the necessity of a system evacuation, permanent equipment damage—even plant shutdown! You can prevent these costly situations by insisting on pure, dry Armour Ammonia. And you can be sure of dependable service and supply, too. Armour maintains offices in 116 cities. Mail this coupon today for information on cylinder and tank truck delivery service.

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R-5

ARMOUR *Ammonia Division*

From the President's Desk

Three new chapters have received their charters. One of the four authorized at the annual meeting last fall has yet to receive theirs. That chapter happens to be Sioux City, Iowa, where the membership has decided on their charter presentation at an early fall meeting. Kansas City was presented theirs in February, and Tampa, Florida and Denver, Colorado, received theirs in March.

CHARTER presentations, like all chapter activities, require a good deal of planning and work on the part of chapter members. All reports indicate that these new chapters have gone about their business in this respect pretty much on the order of professionals.

Ceremonies in connection with initiations of new members, charter presentation and the installation of first officers also worked demands on the national body. NAPRE is much indebted to a number of past presidents, national officers and directors, chapter officers and interested members for their time and effort in making the charter affairs a success. Our thanks go to Ken Holaday, Leo J. Vivien and Hubert Branham for their work as deputies for the charter presentations at Kansas City, Tampa and Denver, respectively.

At Kansas City, Holaday was assisted by Gene Kessler of St. Louis, George Koehne of Tulsa and John Muller of Kansas City. Charles Moneypenny and Henry Fraginal of Miami, George Bright and Charles Gilbert of Detroit assisted Leo Vivien at the Tampa presentation. Felix Powers, Los Angeles, Bill Hoover, Colorado Springs, Bruce Espy, Denver, and C. O. Wilson of Omaha, assisted your national president and Hubert Branham at Denver.

We would be remiss in not mentioning the parties most responsible for the chapter inspiration and formation. Leland Kenagy, our National Treasurer, could be considered the party most responsible at Kansas City. Martin R. Smith, Southern Brewing Company, Tampa, was the motivating factor in that area. Although Marcus Florida, Denver, is the first on record in that city, Mike Bistranin, and Al Nazerenus gave him much competition in founding the Denver group.

New Chapter Contests

Junior Past President Regis Gubser inaugurated the new chapter contest in his term. It brought out some excellent results and will be continued therefore in 1956. Prizes awarded to the first, second and third place chapters were hand carved gavels by Gubser. Your president furnished the financial wherewithal for the necessary plates and inscriptions. Gubser has been imposed upon again for several more new gavels. Like last year the awards to the new chapters will be based on the length of time between the chapter's first meeting and receipt of the charter petition in the National office and upon number of members signed.

The Tampa chapter hardly got settled down after their charter presentation, when the national office received an inquiry with regard to a chapter at Jacksonville. C. Scott Johnson, president of Tampa, has volunteered to promote the necessary activities in the Jacksonville area which will result in another chapter for the State of Florida.

Right on the heels of Johnson's correspondence came a telephone inquiry from member-at-large, A. C. Kniseley. He has a chapter forming at Richmond, Virginia. Therefore we have two more prospective chapters challenging Houston, Texas., Jackson, Mississippi, Birmingham and Mobile, Alabama, the District of Columbia, and New York City for these new chapter prizes. Even our members in Australia are doing more than talking with regard to forming a chapter or an organization down under.

Vice-president McKenna claims that he has had no problem on his hands with revival activities at the Twin Cities (St. Paul and Minneapolis), Omaha, Nebraska and Council Bluffs, Iowa. Indianapolis has already taken the name "Venemann Chapter" and insists they will be the first one chartered at our Fall convention in Detroit. Inquiries have come from Philadelphia, Portland and Louisville for reactivation of chapters in those areas. They too will qualify as contestants.

Double Citation for LA

It has been the custom to cite a chapter for the best report each month. A double citation is in order. Fred Herr of Los Angeles submitted the February report only hours too late for the April issue of IR. Following closely on that report he submitted an outstanding report for March. Both reports are published in this issue. Since both reports would warrant or merit a citation, Fred has earned the unique distinction of receiving a double citation for one issue. His last report covered a dairy plant visit. His details and the photographs which accompanied the report should be beneficial to the entire membership. Further, his report is evidence that California Chapter No. 2 at Los Angeles is complying with the aims of the national education and membership committees; that of having an educational program on dairy refrigeration, and membership drive in the industry.

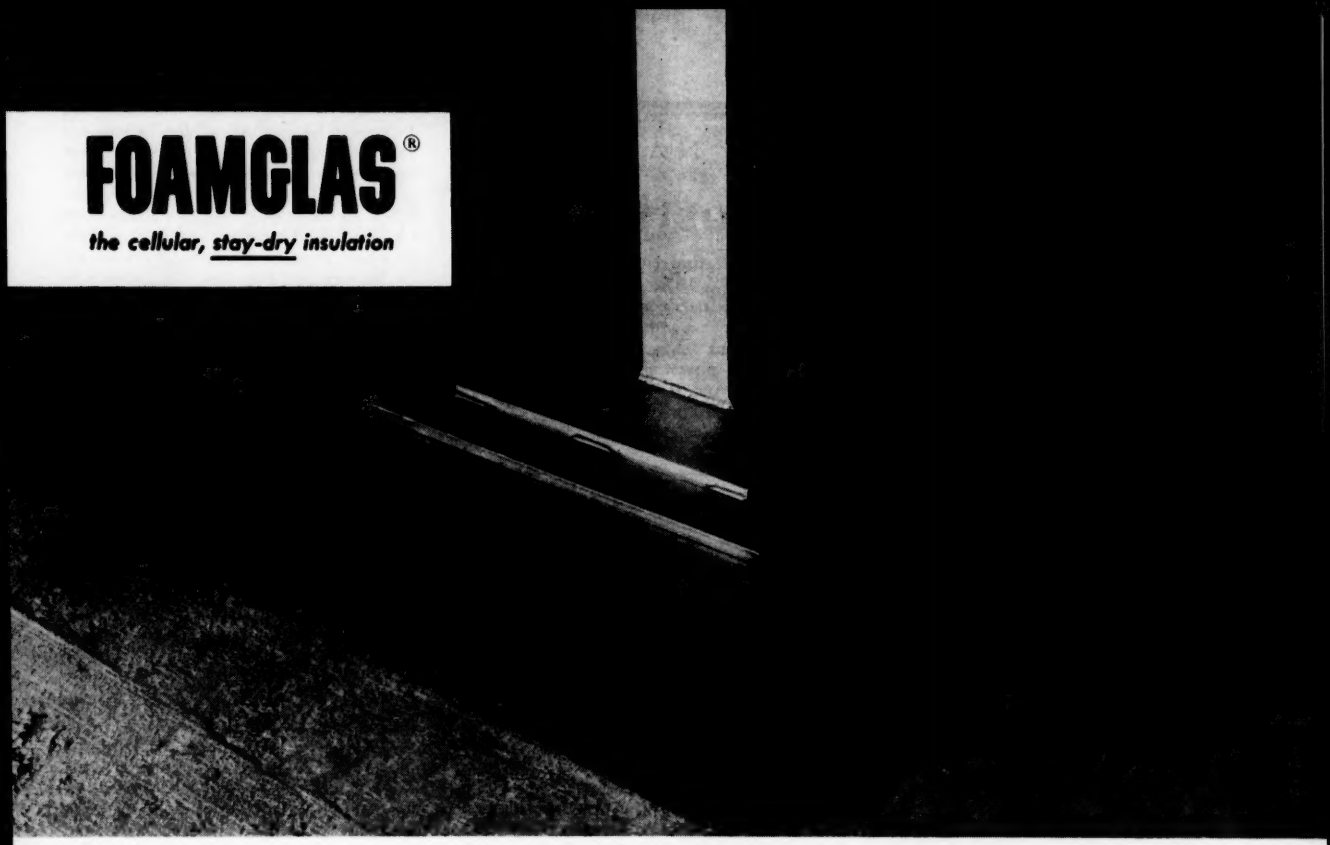
Herr's early report dealt with an impromptu safety program put on by the Los Angeles membership. The subject matter covered was important and rated precedence over the program regularly scheduled for that meeting. It is believed that many other chapters will not only gain from this report but will have emphasized for them the importance of safety and see the justification of having a safety night annually on their chapter calendar.

Air Conditioning Drives

The approach of summer affords the proper time to start a drive for membership in the heavy air conditioning industry. Our Educational Committee will soon publish information on the Psychrometric Chart for normal temperatures as well as for low temperatures used in processing. This is an excellent piece of material to have available when your chapter goes calling on membership prospects in this particular field of refrigeration application.

Chapters are reminded that NAPRE's fiscal year is half over. Emerson Brandt Memorial Trophy is available to the chapter that can show the best effort in the opinion of the president, secretary and membership chairman. The large chapter trophy, based on total new members and conservation effort is held by Los Angeles. Will they retain it again this year or will their perennial competitor New Orleans move in on them? Or is there a dark horse in the picture? In the small trophy category, the trophy was retired by Chicago last year. A brand new trophy will be offered in its place. What chapter will be among the first to claim it? Detroit now seems to be in the lead for it. Members will recall that a small chapter moved in on the Emerson Brandt trophy last year when Tacoma took the coveted prize.

L. Etzel



President Carl Steimle of Southern Michigan Cold Storage says...

"The weight of our new warehouse actually rests on FOAMGLAS floor insulation"

"FOAMGLAS floor insulation actually supports much of the weight of our new refrigerated warehouse." That's the report from Carl Steimle, president of Southern Michigan Cold Storage Company, Sodus, Michigan. They picked strong, stay-dry FOAMGLAS to insulate not only the floor, but also the roof, ceilings and all walls of the new building, first stage in a $1½ million building program.

This unique all glass insulation has a compressive strength of over 7 tons per square foot. Mr. Steimle says, "That made it possible to prevent thermal 'short circuits' by putting insulation *between* all load bearing columns and other structural members. All columns bear directly on FOAMGLAS without reducing its insulating performance."

FOAMGLAS can't absorb the moisture that cuts efficiency of other insulations. "The result," concludes Mr. Steimle, "is *constant*, precise control of temperatures (from —35 to +35F°), and we don't have the headache of recurring insulation replacement."

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Dept. T-56, One Gateway Center
Pittsburgh 22, Pennsylvania

In Canada: 57 Bloor St. W., Toronto, Ontario

Two layers of 4" FOAMGLAS insulate the entire floor area. There are no thermal "short circuits" since all load bearing columns rest directly on this remarkably strong insulation (see close-up, above).

Also manufacturers of PC Glass Blocks

Seeks Cause Of Binding In Idle Rotary Compressor

QUESTION NO. 1104: What experience has the membership had with rotary boosters sticking, and hard to turn over (by hand) while not in operation? What is the cause of it, and what do they do to correct the trouble?—C.G.B., Memphis.

ANSWER: The laminated plastic blades used in vane type rotary boosters consist of asbestos fibres bonded with a phenolic resin. This material is impervious to most substances, but will expand and sometimes distort slightly when in contact with water or liquid ammonia. Lubricating oil and "Freon" refrigerants have no effect upon the blade materials. Therefore, installers of new rotary boosters are cautioned to store the machines in a dry place prior to installation. The entire interior of the compressors, including the blades, is given a shop coat of special moisture-resistant oil to protect all parts prior to installation. This does not have to be removed prior to running. However, if the machine is to stand for more than a month prior to installation it is recommended that the blades be removed, coated and stored.

Clearance is provided in the compressor to allow for the light growth experienced when the blades are in contact with ammonia. Therefore, no trouble is experienced while the machine is running. Wet compression does not swell the blades. This is due to the fact that the blades are warm enough to evaporate immediately any liquid ammonia which touches them. However, care must be exercised to keep liquid ammonia out of the cylinder during shutdown. This is done by closing the suction valve tight before stopping the booster, then closing the discharge tight after the machine coasts to a stop. This prevents liquid accumulation in cylinders.

Where boosters start and stop in automatic operation, a suction line trap must be provided and the piping arranged to prevent the flow of liquid ammonia into the cylinder during a shutdown period. This precaution applies to the piping between the booster and the gas cooler, also. The gas cooler must be trapped and vented so that liquid does not siphon out of it and flow back through the booster in case the discharge check valve leaks. These precautions are good plant practice.

When starting a rotary booster after a long shutdown, it is a wise precaution to turn the machine over by hand prior to placing it on the line. If the rotor does not turn freely, remove the rear head and inspect the interior of the cylinder. If the blades are stuck in the rotor slots, try to remove them without damage. If this is impossible, remove the rotor and allow it to stand in a warm room for a short time. This will permit sufficient evaporation of ammonia to allow the blades to be removed. Clamp the blades to a straight piece of steel and heat to 300° F for several hours. If not back to the original size and free to slide in the rotor slots after this operation, sand the blades to size. Swelling does not destroy the life of the blades. — Fred L. Young, Sr., Chief Engineer, Freezing Equipment Sales, Inc.

NAPRE

Question Box

The National Educational Committee, NAPRE, answers monthly in this column, operating problems forwarded by members. The Committee appreciates answers from the field. Address questions and answers to Prof. Harold P. Hayes, Dean of Engineering, State Polytechnic College, San Luis Obispo, Calif.

Btu Gain In Small Discharge Given Up In Larger Header?

QUESTION NO. 1105: During a discussion of superheat a debate developed about probable effects of restricted discharge piping on a compressor's performance, and superheat and it's overall effect on the system. One member claimed to have observed during his experience with two identical compressors, one with adequate discharge piping and the other with severely restricted discharge piping, that the latter machine had a very considerably higher superheat than the former.

Another member expressed the opinion that though the machine's volumetric efficiency would suffer because of excessive head-pressure, he felt that the added superheat developed by the compressor in forcing the gas through the restricted discharge might be subsequently neutralized when the gas emerged into the common larger header and expanded to the lower head pressure of the other machine. It was his belief that the resultant cooling from this slight expansion of the discharge gas would very nearly equal the earlier gain in superheat occasioned by the extra compression work expended upon it by the machine with the restricted discharge.

We should like the opinions of other operators and engineers on this theoretical problem. We have no question about the advisability of providing discharge of ample size for all compressors, but the question of whether the gas will lose by expansion the heat gained by compression in nearly equal amounts. Such a situation interests us and we wish to know whose reasoning is most sound.

(From the above I believe it is clear that the two machines discharged into a common header leading to the condenser with adequate area for the flow of both machines, and it was at the confluence of the two streams of gas into this header of low velocity that the cooling of the gas from the restricted compressor would take place.) — A.F.D., Rio Grande.

ANSWER: This question is a tricky one to answer because all of the factors are so closely related to each other. The best approach is to take an overall viewpoint without getting too involved in details. There are many differetn types of processes by which a gas can expand from a high to a low pressure and these processes all lie between two extremes. One extreme is the isentropic expansion and the other is the throttling process. The isentropic process assumes no friction and results in a substantial lowering of temperature and heat content of the gas. The throttling process involves a great deal of friction but results in very little change in heat content of the gas.

A restriction in a line is basically a throttling process and therefore involves very little change in heat content. In the particular case you described, the heat content of the gas would be about the same in the header as at compressor discharge. It would be safe to say that the energy input to the compressor to overcome the line restriction is lost energy and that the slight re-expansion to which you refer would be of any gain to you.

Probably the most significant point of all is that for maximum economy we want the refrigerant temperatures in the evaporator and the condenser to be as close to equal as we can get them. Therefore, anything we do to raise compressor pressure and temperature above the minimum required is undesirable from any efficiency viewpoint. Also, your point about a reduction in volumetric efficiency is well taken and is an important one.—H. P. Hayes.

Hermetic Insulation Fails

QUESTION NO. 1106: We have a 7½ ton refrigeration package unit that has given us trouble. This unit is used in conjunction with several others to control temperature of business calculating machines. The business machines are hooded and the hot air is drawn into the cooling unit and the cooled air discharged into the room. The cooling units are semi-hermetics containing monochlorodifluoromethane.

Our trouble developed when the breakers kicked out and we discovered the motor windings had broken down. The operating pressures have been normal 58 to 60 psig on suction and 185 psig on the high side. The units are about 5 years old and they have never been opened or had an oil change. Would the oil break down and cause an insulation failure? What effect does monochorodifluoromethane have on motor insulation? N.M.D., Chicago.

ANSWER: If your operating pressures were as you described (60 psig suction and 185 psig discharge) and if your system was dry, it does not seem probable that oil breakdown could be the cause of your trouble.

In dry systems, there have been a few instances of oil breakdown but these have occurred only at extremely high head temperatures. John Bopp, chief chemist

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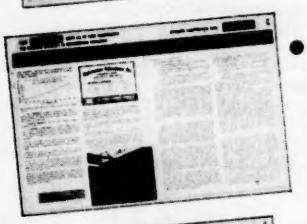
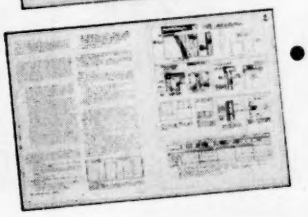


- Technical data assembled for quick reference... helpful installation illustrations



- Time-saving charts, design information, construction tips

Easy-to-follow drawings, charts and information in this new manual have been compiled by refrigeration engineers with years of practical field experience. In quick reference form, it presents basic data to aid both designer and builder. It covers advanced design and construction methods, vapor proofing, overall U values of various types and thicknesses of insulated wall cavities, and other data to relieve the designer of need for complicated computations. Send today for this valuable new aid to insulation planning.

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of refrigeration products at Ansul Chemical Company, states as follows: "In our opinion, no amount of drying or acid removal can save the oil at temperatures of 1000° F and higher . . . In most cases, they are either low temperature systems operating at very low suction pressures on the low side or speeded up undersized compressors also operating at very low suction pressures."

If you have moisture in your system, it is a different story. DuPont's booklet on "Freon-22" points out although "Freon-22" normally has a high dielectric strength and is desirable for use in hermetic systems, moisture may lead to possible electric short circuits. It is my suspicion that moisture may have been your big trouble. Note that "Freon-22" holds a relatively large amount of water; 70 times more than "Freon-12" at 40 F.

You will find some highly useful information in Ansul Chemical Co.'s booklet entitled "Hermetic Motor Burn-Outs". Ansul will be happy to send you a copy. Write them at Marinette, Wis.—H. P. H.

HP Per Ton of Refrigeration

QUESTION NO. 1107: Under the heading "New Refrigerating Machine Improves Performance" page 5, February I.R., it states that the machine is presently available for a tonnage rate of 240 to 410 tons. However, the motor ratings given are 250 and 300 horsepower. Now, I've always understood that a good rule of thumb for air conditioning applications is to figure one horsepower per ton of refrigeration effect. Has this manufacturer improved performance so radically that they get 410 tons of refrigeration with a 300 horsepower motor? To get 240 tons with a 250 horsepower motor, I can understand, but that 410 tons with a 300 horsepower motor is a little hard to swallow. Would you care to explain how they can produce the refrigerating effect claimed? — F.L.K., Detroit.

ANSWER: The rule of thumb you mention is one which I frequently use as a rough check on systems. However, it should be used with considerable discretion because it can sometimes be misleading. The basic point to remember is that minimum horsepower per ton is obtained when the refrigerant temperatures in the condenser and evaporator are as close together as possible.

The amount of heat transfer area in the evaporator and condenser and the temperature of cooling water available are the key factors. If, for example, you wanted 40 F air out of an evaporator, you could obtain it with 0 F refrigerant temperature and not much surface, or 35 F refrigerant temperature and much surface.

The same is true on the high side, where you can keep refrigerant temperature down by using lots of cold water or an unusual amount of transfer surface. Cost considerations usually determine the degree of compromise necessary.

I agree that the figures quoted for 410 tons and 300 horsepower do seem out of line. However, I would expect the manufacturer to be able to support his claim with test data. In summary, it is not impossible to achieve the figures quoted but it would require some departure from the usual approach to the problem.—H. P. H.

Truck Unit Anti-Frost Valve

QUESTION NO. 1108: An article "New Continuous Truck Refrigeration System" on page 4, February Issue, I.R., mentions an anti-frost valve on the blower coil. The article explains the function of this valve and its general operation in the system. Could you describe its detailed operation as a valve? — E.R.C., Chicago.

ANSWER: The anti-frost, or frost prevention valve as it is sometimes called, automatically prevents frost from accumulating on the fins of the evaporator which would result in restricting the air flow and reducing heat transfer.

The valve accomplishes this by metering hot gas into the evaporator in sufficient quantities to prevent the fins of the evaporator from being reduced to a temperature below water freezing point.

The valve in appearance resembles a thermostatic expansion valve having a power element or sensing bulb which is installed at a point where the temperature is to be controlled — in the fins of the evaporator. The temperature range of the valve is adjustable but is pre-set at the factory to start to open at 32 F. Therefore when the temperature at the bulb location is reduced to 32 F the valve begins to open allowing hot gas to pass through the valve and into the evaporator at a point between the expansion valve and the evaporator. Hot gas is supplied to the valve by ⅜ O.D. copper line running from the discharge line of the compressor to the valve inlet. Unlike the thermostatic expansion valve this anti-frost valve is actuated by temperature only rather than a combination of pressure and temperature.

If the compressor still has capacity to reduce the coil temperature to a point below 32 F, then the valve will merely open wider which will direct more hot gas into the evaporator.

It can be seen then that the valve functions to maintain a balance in capacity between the condensing unit and the evaporator and this balance occurs at 32 F, resulting in a frost free, efficient evaporator operating on as low a temperature as possible without frosting.—D. F. Pillow, Kold-Hold, Lansing, Mich.

New Questions

Doubts Humidifier Effective Under Winter Load Condition

QUESTION NO. 1109: How can I present proof of possible water and steam savings to be accomplished in the winter-time operation of our industrial air conditioning equipment? We mix return air and fresh air, filter it and deliver it at 65 F to a spray chamber. Water is from city mains at 45F and wasted after this use. From this humidifier the freshened air goes through eliminators and a (steam) reheat coil. Then back to equipment rooms at 65 F, and minimum 40% — maximum 55% rh.

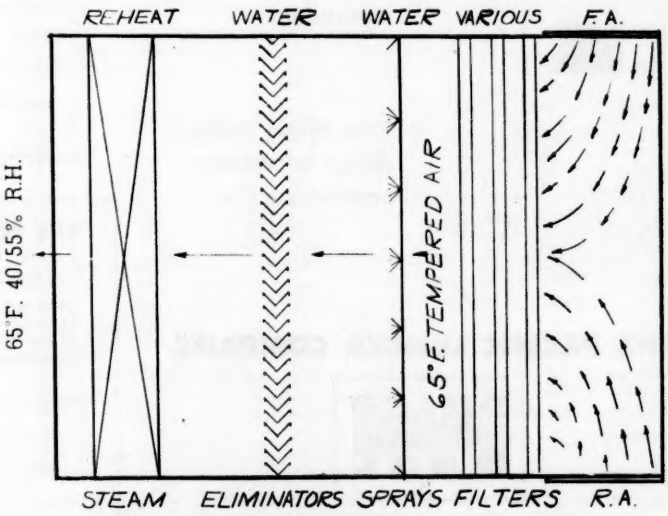
It seems that water can be saved by adding a mixing valve and introducing heated water, resulting in 70 F water at sprays. Steam would be saved as less reheat would be required. An average of 50,000 cfm per unit, and several units per building are involved. Why not recirculate the spray water?—N.M.D., Chicago.

pH Test Supplies Sought

QUESTION NO. 1110: How would a person proceed to equip himself with pH testing facilities and procedure instructions in the average industrial plant? S.A.C., Chicago.

Questions Inhibitor Use For NH_3 Refrigerating System

QUESTION NO. 1111: Has anyone heard of or seen, or used, an inhibitor in liquid NH_3? The party bring-



Plenum Chamber Typical of Question No. 1109

ing the inquiry is not an operator, but insists that at some location (exactly where he cannot now recall) in his travels, an engineer was using one.

To what end, or for what purpose, would one use an inhibitor anywhere in an NH, refrigeration system?—H.T.McD., Chicago

Large Hermetic Centrifugals Spark Refrigerant Inquiries

QUESTION NO. 1112: American Blower Company announced a new single stage hermetic centrifugal refrigerating machine called "Tonrac". They say it uses "Freon-113" as a refrigerant. This I suppose would be the same as "Genetron-226". What would Carrier call it? "Carene-7"?

Why is the "Freon-113" so adaptable to hermetic units; or maybe I should put the question this way: Why have manufacturers gone to hermetics in this field, the unit type water chiller? Is it because the machines with this refrigerant run in a vacuum? What are the characteristics of "Genetron-226" that makes it so desirable for package chillers for air conditioning purposes?—C.H.H., Detroit.

Railroad Units Minus Driers

QUESTION NO. 1113: Why should a leading refrigerator manufacturer prohibit the use of a drier on equipment for the new mechanical refrigerated railroad cars?—S.A.C., Chicago.

News Notes and Chapter Activities

Tulsa

BILL SWADLEY

OUR PRESIDENT, Lawrence Wagner, substituted for our scheduled speaker who was unable to attend at the last moment. He brought a thermostatic expansion valve, which he had cut in half and explained the operating principles of this valve to the members, and answered questions on the operation of the valve. The larger part of the evening was taken up by our safety program, presented by Safety Chairman Kenneth Gruese. Gruese had three films obtained from the Sinclair Oil Company.

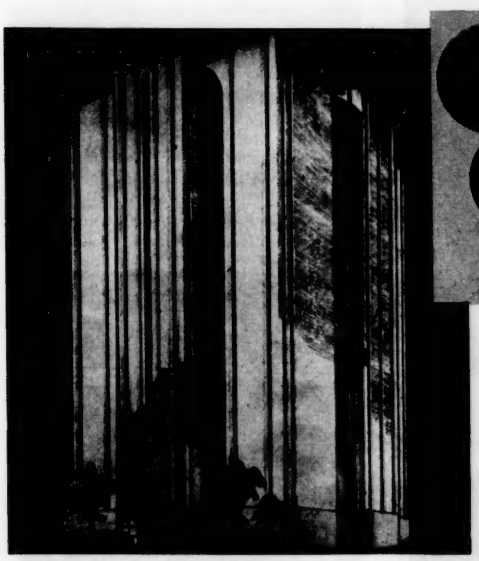
The first film was on protection of the eyes. Gruese brought several types of goggles and demonstrated their use for various jobs. The second film was on the proper way to lift, describing how the muscles function on lifting. The third and final film was how to prevent accidents from happening. The use of these films while not actually pertaining to refrigeration, brought home some pointers on plant safety, many of which we take for granted.

Memphis

CHAS. CONLEY

FIRST MEETING in March found Instructor H. L. Todd still talking on refrigeration compressors, their design and their use, the various types of refrigerants. He had a small compressor operating and had one that was cutaway, which was dismantled and put back together for the class. Pres. J. H. Robinson, showed a colored talking picture of "The Land of the Kangaroo". Alvis J. Clay Past Natl. President could not attend the meeting as he had a very unfortunate accident while making some repairs to an electric fork lift truck.

At our second meeting of the month, March 21, Todd talked on refrigeration condensers. He continued his use of the blackboard and a small condensing unit in operation to explain his talk. He showed the effects that the amount of water being put through the condensers had on the condenser pressure and the horsepower. He also explained the various types of condensers and which type is best suited for any one operation. President J. H. Robinson showed a colored sound and motion picture of the Western and Winchester Arms Company's plant which showed all the various operations needed for making guns and ammunition.



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Detroit

LEO GAGE

OUR CHAPTER made a plant visitation trip to the American Blower Corp. on February 23. Members first met at the Foodcraft Dining Room for dinner. We had 65 people for dinner, and 18 other members joined the group at the American Blower plant, making a total of 83 attending. We were conducted to their Conference room where a program was presented to us in two sections. The first was devoted to the subject of the centrifugal refrigerating machine and consisted of a discourse on the subject by R. O. Loebl, Application Engineer. He was aided in his talk on Centrifugal Compressors by the use of colored slides. The second section was a discourse on fluid drives by Ben Ragland, Manager of Fluid Drive Department; also illustrated with colored slides.

After the lecture in the conference room, members and guests were taken down to the first floor where the laboratory is situated, to inspect and observe the operation of the centrifugal compressor. The group also inspected the fluid drives and watched some of them in operation. The fluid drives in operation had transparent plastic cases so that every movement of the fluid, etc., could be observed, as well as the r.p.m. at various stages as the regulating quadrant was moved. A speed indicator being fixed to a table next to the fluid drive mechanism, with the revolutions showing in lighted numerals indicated the speed changes in the demonstration.

Questions from members, directed to Bob Loebl, ABC, concerning the new "Tonrac" unit, brought the following (abbreviated) answers:

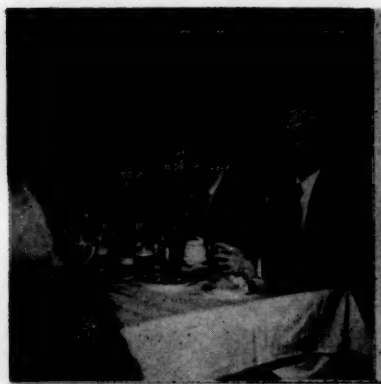
Advantages of the hermetic centrifugal compressor is the simplified field installation as there is no motor, gear, nor compressor to be aligned.

In the hermetic, there is no chance for loss of refrigerant.

Hermetic construction allows operation at 3600 rpm with a single stage compressor direct-connected, giving higher performance characteristics.

Trichlorotrifluoroethane ("Freon-113" or "Genetron-226") is employed instead of trichloromonofluoromethane ("Freon-11" or "Genetron-11") because of higher specific gravity, higher volume per rpm, which enables use of single stage equipment.

An American Blower Air Conditioning & Engineering Handbook was presented to us for our chapter library by Cecil P. Shaw, Advertising Manager. In addition to Shaw and R. O. Loebl, Application Engineer on Centrifugal Compressors, our hosts were Ben Ragland, Manager Fluid Drive Department; William Barrett, Application Engineer, Fluid Drive Dept.; Holly Grubb, Application Engineer, Centrifugal Compressor Dept.; Richard Neldon, and Kenneth Burkhardt, Assistant Directors, Research Dept.; Edward Vendell, Application Engineer, Power Plant Equipment Dept.; and Thomas Brockie, Supervisor, Research Department.



TOP—Chapter Brass at Detroit's February Meeting: l. to r., Roy T. Burns, National Director, Chas. V. Heemstra, President, Leon L. Adams, Sec'y-Treas., and Leonard Bedard, Vice-Pres. American Blower Co.'s "Tonrac" unit on test for the Chapter visit, took on appearance of a porcupine in many places due to thermometers and instrument attachments.

Center—Fluid drives were demonstrated by ABC by means of lucite, phenolic or plexiglas constructed models which gave clear view of the hydraulic behavior within. Members of the Chapter enjoying a fine dinner enroute to the American Blower Co. plant.

Denver Chapter Chartered

PRACTICAL Refrigerating Engineers in Denver officially affiliated with NAPRE on Friday, March 23, at a dinner meeting in the Argonaut Hotel. A Charter, granted by NAPRE's Board of Directors at Los Angeles' Convention in November 1955, was presented by Leroy Etzel, National President, and the General Superintendent of Refrigeration, Pacific Fruit Express Co., San Francisco, California. Accepting the charter for the Denver group was Mike Bistranin, chief engineer for Safeway Stores warehouse, president of the chapter.

Assisting in the initiation of new Denver members, the presentation of the Charter, and the installation of the Chapter's First officers was Hubert Branham, Refrigera-

Present for charter night of the Denver chapter of NAPRE was Leroy Etzel (right), national president. At left is Hubert Branham, association director; and Mike Bistranin, Denver chapter president.

tion Superintendent, PFE Co., Pocatello, Idaho, and NAPRE Director, and C. O. Wilson, PFE Co. Superintendent at Omaha, Nebr., H. C. "Dutch" Diehl, Director of The Refrigeration Research Foundation, Colorado Springs, Colorado, a former San Francisco Chapter member, sent his regrets at missing the affair due to prior committment. Diehl transferred his membership to the new affiliate.

Bill Hoover, TRRF, addresses the assembly on behalf of Director Diehl. Both Diehl and Hoover, NAPRE members, affiliated with the new chapter as charter members.

Principal speaker at the ceremonies was Felix W. Powers of Los Angeles, formerly of Denver. A member of the Los Angeles Chapter, Powers heads his own refrigerating engineering business there. He started in the refrigeration business in Denver in the early 1900's with the Brecht Butcher

Felix Powers, Denver Native, returned to his haunts of younger days to encourage younger Denver engineers with regard to their future in the industrial refrigeration field. Mrs. Mike Bistranin is the lady at Powers' right.

Supply Co. As a machinist, he assisted in the design and manufacture of the first "false heads" for ammonia compressors, a device credited with making it possible to use vertical compressors efficiently for ammonia.

Bruce Espy, Al Nazarenus, Chapter Vice-Pres., and Nat'l Director Hubert Branham indulge in some post-dinner reflections.

Other officers of the new Denver Chapter are Albert Nazarenus, Chief Engineer, Beatrice Foods, Inc., and Dean A. Dungan, Field Erection Engineer, York Corporation, Vice Presidents; Marcus Florida, First Asst. Engineer, Safeway Stores, Whse, Secretary-Treasurer; and Charles Beals, Maintenance Engineer, Beatrice Foods, Inc., Sgt.-at-Arms.

Colorado engineers, all earlier NAPRE members, who assisted Etzel in the chartering activities were Al Nazarenus, a Denver Vice President and former Los Angeles member; J. Bruce Espy, Secretary-Treasurer, City Ice Co., a member-at-large for four years; and William J. Hoover, Assistant to the Director, TRRF, Colorado Springs.

Guests of the Denver Chapter were Carl Newman, Denver Agent for PFE Co., wives of the charter members, three sisters of Felix Powers, Mrs. Mary A. Brewster, Mrs. Zelpah Rhea and Mrs. Wanda O'Hagan all of Denver; Mr. Gerald Holtzinger, president of RSES in Denver, and Mr. Gerald Konrad, superintendent at City Ice Co. who signed up as a member.

On March 14, Denver started its two meetings per month, the second to be spent entirely on Basic Refrigeration. This was our first meeting for our study course night. We had the worst snow storm of the year and had 22 present. We feel it was a huge success. Mike Bistranin, our president taught the class and did a bang up job. He covered the first chapter in the book on heat. We had some interesting class discussion and worked out some of the problems together. The fellows are

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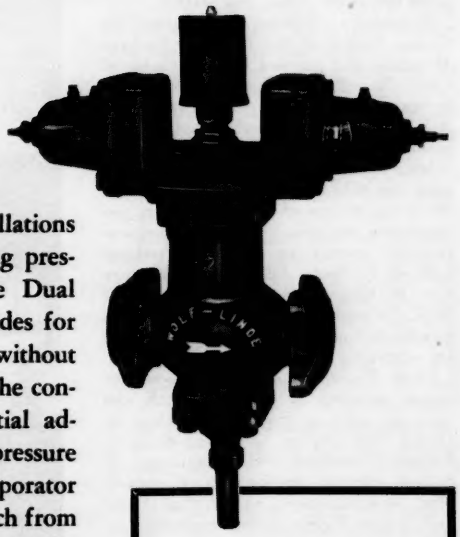

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very enthused and I believe Denver will have more members *EARNING* the certificate than any other chapter during the next year. We discussed the purpose of NAPRE for the benefit of our members.

John Rohrs, Jr., Service and Erection Engineer for Rocky Mountain York, and Dean Binkley, Chief Engineer at Beatrice Foods Cold Storage Plant, were elected to our board of directors. Mike Bistranin, president, Al Nazerenus, 1st vice-president and Marcus Florida, secretary, are the other three members of the board. Balance of the meeting was given to talk over the coming charter presentation and the importance of all our members being present. The meeting was adjourned after coffee and donuts.

Los Angeles Chapter Visits Dairy Farm

Fred Herr

SONS OF many Los Angeles Chapter members turned out to make the Chapter's Field Trip to Adohr Milk Farms an outstanding success on the night of March 21. The NAPRE group assembled in the Adohr Company's conference room on the second floor of the administration building to hear Adohr's chief engineer, Carl Larson, describe some of the refrigeration and pasteurization machinery that would be viewed on the tour that was to follow. The pasteurization and cooling equipment in the plant is composed of totally enclosed units with no mechanism visible from the outside, for which reason Larson had arranged to present some illustrated talks before the actual tour started.

Preliminary lectures were given by George Haxton of The Creamery Package Manufacturing Co. and Howard Carter of Cherry-Burrell Co. Principles of high temperature short time operation and how it is applied in the Adohr plant was explained by Carter who used a series of colored slides by means of which the audience was able to follow the milk through the entire process of cooling, heating, pasteurization and recooling. The session was formally opened by Chapter President Clifford P. Scott. Educational Chairman Guy R. King, with the collaboration of N. P. DeSantis, chairman of the chapter's membership committee, was responsible for arranging the interesting tour.

Chief Engineer Larson introduced the various members of the Adohr staff who were to serve as tour guides. They included Phil English, consulting engineer, DeSantis, assistant chief engineer, Al Schara, assistant engineer, A. C. Cutler, plant superintendent, and Arthur Reyer and Walter Wallin, junior engineers.

Pasteurization Development

In his talk on high temperature pasteurization, Carter presented a brief history of pasteurization and how the HTST system was developed. He explained the two general methods: (1) To heat the milk to 143 deg. F and hold at that temperature for 30 minutes; and (2) to use the HTST system under which the milk is heated to 161 degrees and is held there for only one second. This, Carter explained, results in higher temperatures and much shorter holding time. The HTST method of milk processing, he said, is now used in most of the major milk plants.

After the 45-minute lecture period in the conference room, the NAPRE visitors were divided into groups of 10 to 12 persons and assigned to guides for the tour of the refrigeration, processing and power installations of Adohr's plant at 1801 S. LaCienega Blvd., Los Angeles. A thoughtful gesture was the stationing at each of the major equipment units, a technical man representing the company which had designed and installed the machine. Serving as information men were Carter and Haxton, Howard Castle, Frank Volelsang and John Dystra, with engineers Larson and DeSantis pinch-hitting with data whenever a request came from an NAPRE tourist.

The tour included the garage, where the visitors were able to observe the type of refrigeration units being installed in Adohr delivery trucks, the milk receiving rooms, cooling rooms, pasteurization chambers, and the equipment pieces involved in the HTST process.

Size of this milk operation was gained by members from the fact that the HTST Pasteurizing system is employed to process 18,000 pounds of milk per hour in each of two HTST machines, and that then has to be cooled to 34 F. The ice cream load is 20 tons, and milk storage 37 tons per hour. In addition, the Adohr company produces 40 tons of ice per 24 hours and 54 tons of refrigeration per hour for other uses. The plant's refrigeration equipment includes four 300 gal. farm tanks used for cooling ice cream mix. Two 4-cylinder, 3 hp "Freon-12" units (one 3 hp power unit per each two tanks) holds the mix at 35 F.

The CP booster compression refrigeration system used in this milk plant drew the greatest attention from the NAPRE visitors, both in the preliminary lecture and during the actual tour of the machinery rooms. Full details of the booster compressors, 2nd stage compressors, low temperature evaporators (minus 40 F), intercooler, high temperature evaporators (17.6 F), and condenser, receiver and valve operations were given by the specialists stationed at the various points in the plant. Chief engineer Larson revealed that another HTST pasteurizer will be installed in the Adohr ice-cream department.

Other equipment inspected included three Vilter 2-cylinder VSA synchronous driven compressors (9½ x 9½) operating at 45 lbs. suction pressure and 165 psig condensing producing 230 tons, and two Frick VSA (7 x 7) operating at 250 rpm on 25 psig suction from the booster discharge. The Creamery Package boosters were designated as one 4-cylinder (3½ x 5) with an automatically controlled 2-

Taylor Instruments comprise the major indicating, control and recording devices for the two 18,000-lb/hr HTST pasteurizers at the Adohr Farms Dairy plant, Los Angeles. Major units on these two control panels are: left and right at top, cold milk recorder and thermal limit recorder-controller; l. & r. at bottom steam pressure regulator and heater temperature controller. Smaller pressure gauges placed vertically between the recorders are, top to bottom, air, water pump discharge, sweet water pump discharge, and steam supply. Row of horizontal motor start-stop stations on the panel at left control heater circulating water, raw milk, milk, sweet water pumps, and two homogenizers. The three switches, placed vertically between the indicating instruments complete the control requirements for the pasteurizers. On the panel at right, located horizontally are control indicators and start-stop stations for the circulating water and raw milk pumps, plus a timing pump and a third homogenizer. Blanked off outlets are for a clarifier and air compressor.

speed 10/20 hp motor, and the other a 6-cylinder (5 x 5) with a 125 hp motor, both v-belt driven. A social period with the collation comprised of the company's product, was sponsored by Adohr personnel after the conclusion of the plant tour.

Safety Steals Show

A lively discussion of safety in refrigeration developed at the March 7 meeting of Los Angeles NAPRE Chapter when National Past President Regis Gubser presented some data and photographs of a recent explosion in a small retail ice plant in San Juan, Tex. The accident had wrecked the plant, killed two men and injured another.

Gubser revealed that he had written to the Chamber of Commerce of the Texas city requesting information on the cause of the explosion, for use in the NAPRE safety program. The reply with a number of excellent photographs, came from a Texas NAPRE member. While the factual data received was meager, photographs of the wrecked plant permitted him and his associate engineers at California Consumers Corp., to reach some conclusions on the probable cause of the explosion, which he wished to present. He drew a chalk diagram on the blackboard to show how the machinery was hooked up.

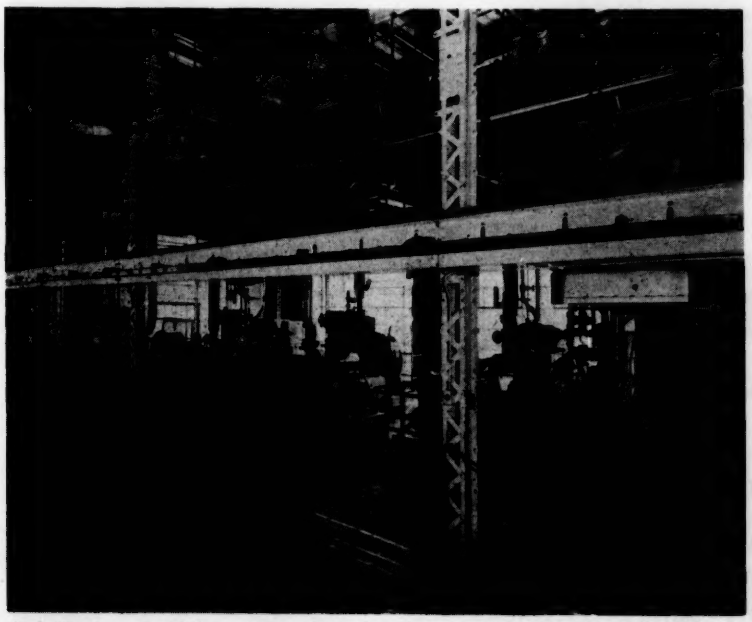
"It seems to have been a single cylinder 3 x 3 York compressor," he said, "with shell-and-tube condenser, 10 inches in diameter, with 1-inch standard pipe. From the information sent, they had had some trouble with the machine and had sent a repair man down on a Sunday to take care of it. He took down the machine, removed the pistons and valves and re-assembled it. Just what the original trouble was, and what repairs he made, was not known. At any rate, shortly after he had put it into operation again, it blew up with a terrific explosion that literally blew the machinery and building to pieces, killed the repair man and his assistant, and blew a third man, an onlooker, through a window and seriously injured him."

Photographs which Gubser passed around for examination showed that the condenser had been turned end-for-end and torn open as though with a giant can opener. The compressor was broken off and its head was gone. The suction valve had disappeared and the seat of the relief valve had vanished. The high-side cut-out was operative and at a subsequent test would open at 125 pounds.

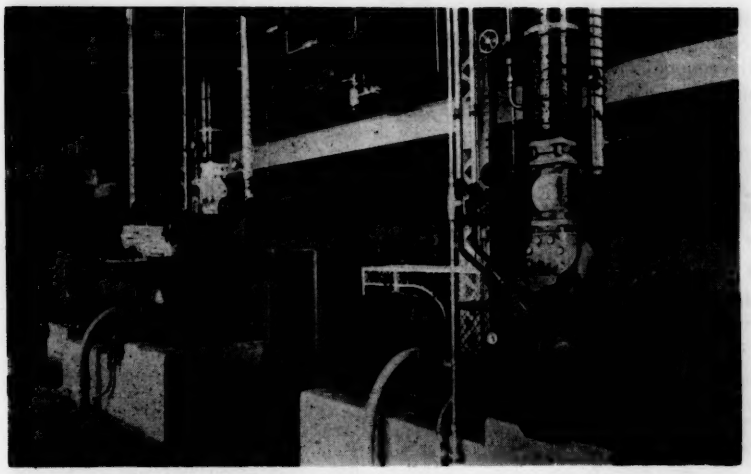
"Our assumption" Gubser declared, "is that the man failed to pump out the machine after he had put it together and that a mixture of oxygen and oil vapor ignited and caused the explosion. Our theory is that the explosion must have been triggered by a mixture of accumulated gases."

Spirited discussion by many of the members and guests at the meeting followed, during which all possible reasons for the explosion were offered. At least 20 of the refrigeration men present took the floor to explain what they thought might have happened and what could have been the impelling cause of the blow out. The final concensus was that an accumulation of gases, which should have been withdrawn prior to re-starting the machine, was the probable cause.

Although it was impromptu in character and introduced as an unscheduled part of the evening's agenda, the discussion developed into one of the most outstanding Safety features that Los Angeles has ever had.



Overall view of Adohr's refrigerating plant from position atop the firms 40-ton ice making tank. Beyond the oil service day tanks and the booster compressors (with the v-belt guards) are three Vilter VSA compressors operating on the plant's 45 psig suction system. At right are two Frick secondary compressors taking suction from the 25 psig inter-coolers in the two-stage portion of the plant systems.



Close-up of The Creamery Package Manufacturing Company's booster compressors at Adohr Farms, Los Angeles. Larger 6-cylinder machine at the left is driven by a 125 hp motor, handling minus 40 F suction gas which is compressed and discharged through an inter-cooler at 25 psig. Smaller 4-cylinder compressor at right permits wide flexibility not only with cylinder unloader use, but with a two speed, 10/20 hp, motor. Motors are by Fairbanks-Morse, 1140 rpm.

Question Box Session

President Clifford P. Scott called the business session to order. Larry Benedict served as moderator of the Question Box period during which a written query submitted by a member was discussed. The question dealt with whether there were in Southern California any CO_2 systems in operation other than in dry-ice plants. Herbert N. Royden supplied the answer and advised where and by whom CO_2 plants were operated.

The preliminary class was conducted by Alex M, Shears. The subject studied was Chapter No. 26 in Guy King's text book, dealing with carbon dioxide dry ice. Considerable discussion developed on the dangers of plant personnel entering com-

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partments or man-holes leading to underground chambers where the fumes of dry ice are present. What the symptoms of dry-ice fume inhalation are and what to do if a workman suspects he has been exposed to them, was discussed by students and members alike for some 20 minutes.

Technical speaker at the March 7 meeting was Kenneth Calvert, factory engineer, Chase Industries, who gave a talk and demonstration on "Cooler and Freezer Doors, Hardware and Gaskets." The previous meeting (February 17) had featured a talk on "Modern Practices in Corrosion Control" by J. C. Lacy, sales manager, Amercoat Corp., Los Angeles. The talk was illustrated with slides showing the effects of corrosion from various liquids and other causes on different types of metals. He discussed the various types of modern protective coatings that are now in use, as well as some of the reasons behind making the proper selection for the specific application. He included some discussion on galvanized coatings, as well as vinyls. Four new members were accepted at the February 17 meeting. They were, Richard T. Maul, Arthur Reyes, Harold O. McNeeley, and Gilbert D. Sanches.

Chicago

BILL O'REILLY

CHICAGO CHAPTER settled an old score, in part, with one of its members on February 11, when it honored Gene Rytlewski at a dinner. A Past National Director, Gene has long been either educational chairman or instructor, and sometimes both, for members of this chapter. A wall-bustin' overflow crowd turned out in Chicago's worst blizzard of the season, the most impressive testimonial of the evening.

Many members, some fairly close business friends of the honored member, did not know the versatility of the man. Fred T. Brandt, Consultant, and retired president of Westerlin & Campbell Co., (now York Corp. Central District) was MC. He

Chicago's honored member Eugene Rytlewski and his wife, pause for a photo 'tween polkas at the February party staged for them by the Chapter.

Celebrities row at the testimonial dinner honoring Eugene Rytlewski. L. to r. Mrs. and Nat'l. Vice-President Bert C. McKenna, Mrs. Rytlewski and the member honored, Mrs. and Chapter President Nicholas M. Downes, and Fred T. Brandt, caught coffee sippin'. Earl J. McMichael, Entertainment Chairman, supervises activities.

told of Gene's hidden talents. It seems that Rytlewski could substitute without much difficulty for some of the concert stage pianists of the same descent. Music masters are no strangers to this refrigeration engineer, which explained the presence of that grand piano in Gene's living room. Everyone had guessed that his Mrs. and daughter were the leading musicians of the family.

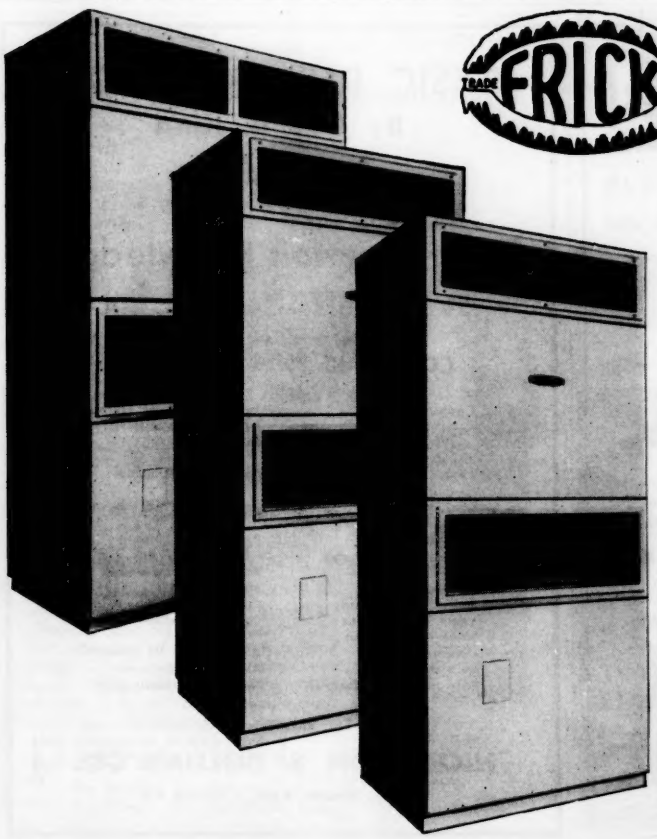
More secret accomplishments were unfolded by Brandt. Members learned that Gene is an avid art student, had painted, and was a member of Chicago's Art Institute. That explained his meticulous and painstaking work over the drawing boards. Is it possible that he sees in the reefer plant layout, a work of art requiring the right weight line for the liquor supply, just the nth degree to that curve to give the isometric of a pressure vessel its perspective, and letter-perfect legends for clearness of detail?

Members were extremely happy to honor Gene, as shown in the travels some of them performed, coming from Green Bay and Appleton, Wisc., from Michigan City, Ind., and Rockford, Ill. A Golden Hour clock, suitably inscribed was presented to the guest of honor. Many congratulatory messages were read. A Polish dinner stuffed those members in attendance, and Polka dancing helped them work it off for more refreshments. Entertainment was arranged by Earl McMichael and Mrs. Hubie Rancour got the pictures.

President Downes opened the business meeting and introduced a guest, Frank Goulding, who was passing through Chicago and dropped in for the meeting. Goulding is the corresponding secretary of the Tampa, Fla., chapter. An application for membership from F. T. Brandt, an old friend of Gene Rytlewski, was voted upon and passed unanimously.

A motion was made and seconded that we petition the National Board of Directors for the NAPRE National Convention to be held here in Chicago in 1957. Secretary Bill Tiffin was instructed to send a letter to the National Board. It was understood that it would be a big undertaking and that everyone would have to do his share of the work involved in order for it to be successful.

John Forti, program chairman, introduced D. H. McKenna, Kinetic Chemical Division of the DuPont Co. McKenna gave us a talk on "Freon-22". He told us of its properties, applications and possibilities; of its refrigerant characteristics, dielectric strength, water solubility, that "Freon-22" has a leakage rate only a little higher than "Freon-12" at the same pressure. He stated that a Halide torch or lamp is one of the most effective and easiest ways to detect a leak in a system charged with "Freon"; that anti-freezes are not recommended with any "Freon" refrigerant, because it tends to increase



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corrosion. He told of the factors that have to be considered in designing a system for "Freon-22" because of the higher operating pressures, and told of its wide usage in industrial refrigeration.

At the Chapter's "Valentine's Day" meeting the instruction class was presided over by Don Rosenbloom. He reviewed the first part of the chapter on "Heat Calculations" from the Guy King course; then went on to complete the chapter. He explained the different formulas and worked out problems. As an "added attraction", there were three problems on air conditioning, and three problems on refrigeration that were made up and put on the blackboard. Some of the members were chosen and others volunteered to work out the problems and have them at the next meeting. This was done in order to help members understand the different factors involved in heat load calculations. Through the courtesy of Freezing Equipment Sales Inc., copies of "Refrigeration Compressors in the Frozen Food Industry" were available for those in attendance.

Our January 24 meeting consisted of a field trip to the Underwriters Laboratories here in Chicago. Our host for the evening was W. A. Farquahr, Assoc. Eng., who first explained the functions of the lab. We were then divided into groups and toured the facilities. A report on the activities of the Underwriter Laboratories, as viewed by the group, is given elsewhere in this issue of IR.

At our first meeting of the year, Jan. 10, Don Rosenbloom conducted the refrigeration class. He gave instructions on chapter No. 8 "Heat Calculations". Don explained how to find the design temperature, how to work out problems concerning leakage, K-factors, usage factors in reach-in boxes and boxes over 1500 cubic feet. He showed us how to choose the right size condensing unit, evaporators. He did all this by applying the different formulas used in the calculating of sample problems in the text.

John Forti, program chairman, introduced A. W. Goding of Goding Electric. Goding had a partially wound motor on display, and explained to the members how a motor is wound from beginning to end. He answered many questions on maintenance and repair. It seems that everyone's problem concerns the dirt, oil and other substances that collect inside a motor. Goding gave some suggestions on how to correct this and also told of the cleansers that may be used.

Greater Kansas City

JOHN MULLER

ON MARCH 6, the meeting of Greater Kansas City Chapter called to order by President Kenagy in the new meeting place at the Federal Cold Storage (a division of City Products Corp.) Business was short. J. L. "Red" Edwards and new member Mickey Goetz were appointed co-chairmen of membership committee. Everyone was asked to make an effort to bring one guest to each meeting. Chet Rose was commended on his ability to take pictures and was appointed official photographer. V. P. Crocker was commended on the fine table he made for the meeting room.

The instructor then took charge of the meeting and the first chapter of the Manual was reviewed. Members were paired off to define and discuss the various refrigeration terms and phenomenon covered by the first chapter of Basic Refrigeration. There was considerable discussion regarding partial pressures, Dalton's Law of Perfect Gases, and the relationship of gauge pressure, absolute pressure, and vacuum. A very brief discussion of evaporation, boiling and the similarity of a steam system and a refrigerating system was held. Mickey Goetz furnished a one pound can of "Genetron-12", which was used to demonstrate the action of the liquid refrigerant at atmospheric conditions.

Our February meeting of the chapter was held in room "C" of the Town House Hotel. It was at this meeting that Crocker reported an unfurnished room at the Federal Cold Storage plant, which General Manager H. N. Sumner offered to the organization for use as a meeting room. Our chapter voted unanimously to accept this invitation.

A. C. Boyd filled in as temporary instructor in the absence of Mr. John Muller, (and J. L. Edwards pinch hitted for Muller also in the matter of the chapter report). A review of the various forms of heat were discussed. A study of vapor, gases, energy, pressure and scope of refrigeration were then studied and discussed.

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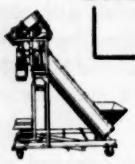

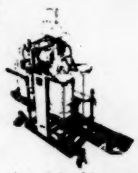

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Rio Grande Valley

ARMIN DONEIS

DURING THE educational session of February 14, we finished discussing the last part of Chapter 7 on Operating. When the matter of calculating superheat in a compressor's suction and discharge came up for discussion some members felt that a few strategically situated thermometers could tell the practical engineer all he needs to know about the condition of his plant and machine's operation and that the use of a lot of charts and curves was superfluous for operators. Others felt that they can now understand and appreciate better the problems arising from superheat after having seen the relationships graphically represented in this chapter.

The death of our past-president B. F. Wilson, Jr., who had been critically ill and badly paralyzed in Purcell, Oklahoma, for almost two years was reported and received with sorrow by his fellow-members. Condolences and flowers went forth to the family from our chapter.

At our March 21 meeting, considerable concern was expressed when it was announced that our charter member, Russell M. Sawyer, is confined to a hospital in Houston with a very serious illness. It was moved and seconded and passed that our chapter send flowers, cards, at appropriate times to Russell. Also that our chapter pay his membership dues for this year.

The secretary read a communication from the central office in Chicago which was sent to notify our chapter that four former members were definitely stricken from the rolls for non-payment of dues, and that six more were in imminent danger of being dropped unless dues were forthcoming immediately. Treasurer Clyde Young volunteered "to go to considerable inconvenience to accept dues from all present", and urged all members to get their receipts from him without further delay.

Guy King's course, Basic Refrigeration, served as the basis for discussion of refrigerated enclosures and the wide choice of insulating materials and means of providing a suitable vapor-barrier, preferably on the warm side of the insulation. Armin Doneis conducted the discussion. A. M. Casberg presided over the Question Period and kept the ball rolling on the problem of oil-slugging of high speed multicylinder compressors with consequent damage to valves and cylinder heads, because considerable quantities of oil came back through the suction line at intervals and raised havoc with the machines. The obvious answer seemed to be suggested by several members who urged the immediate installation of an oil-trap in the suction line with either an automatic trap to drain the oil to the compressor crankcases, or provision for frequent manual draining of the oil out of the trap to avoid its spilling over into the compressor's suction ports.

Members-at-Large

FRANK CHASE

SOME OF the nicest and most interesting letters come from Members-At-Large, the world over. Ricardo Redlich, Casa Teodoro Harth S.A., Lima, Peru, wrote "This is to acknowledge your kind letter of February. I am indeed one of your members-at-large in foreign countries and am glad to belong to the NAPRE. Your excellent magazine brings me extremely useful information and I have also purchased the refrigeration course published some time ago.

"I do not operate a refrigeration plant; my activities are different. I lecture on the subject of refrigeration and air conditioning at the Peruvian State Engineering University in Lima, Peru. Furthermore, I am in charge of importing and installing refrigeration machinery for an important company in Lima.

"Here in Peru we are installing refrigeration on an increasing scale for all known applications; specially, our fishing and canning industry and freezing vessels. We are also making headway in air conditioning.

"I travel frequently. In 1953 I visited Chicago and drove twice to 435 North Waller Avenue in an attempt to get acquainted with the management of NAPRE but unfortunately this happened on a Sunday when none of the members were present.

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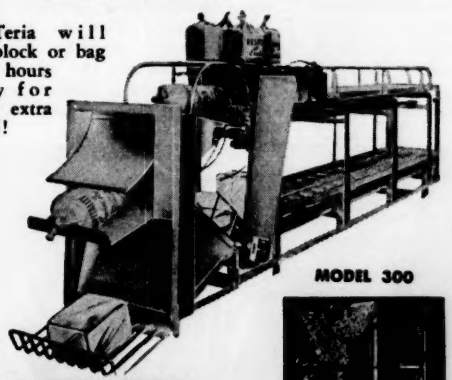
ICE VENDORS FOR EVERY REQUIREMENT

Ice-A-Teria will vend block or bag ice 24 hours a day for those extra SALES!



MODEL 300

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Speeds production, eliminates waste, cuts operating costs. Simplifies crushing and bagging, due to 300 lb. capacity of hopper. Fills and weighs 360 - 12½ lb. bags per hour. Adjustable for bag size, weighs 6 to 25 lbs. Portable, will clear any standard vault door.

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SCORING MACHINE PARTS AVAILABLE FOR IMMEDIATE DELIVERY

LIQUID EYE

positive sealing INDICATORS

can be made to your exact specifications

Illustrated: 3/8" M.P.T. x 3/8" M.FL.

Allin engineering recently solved a leading manufacturer's tough problem on automobile air conditioning with this "MIDGET" LIQUID EYE

A few of the important LIQUID EYE features:

spring-loaded gaskets for positive sealing against leakage • unrestricted full line flow • pyrex glass, double sealed at sides and ends, provides instant visible check of refrigerant condition • guaranteed to 500 psi. • precision made.

One or more of the wide variety of standard Liquid Eye sizes and styles may meet your needs perfectly—or we'll make them to your particular specifications.

Write today for Catalog D-55 containing the Allin line of quality products.

Allin MANUFACTURING COMPANY

1153 West Grand Avenue Chicago 22, Illinois

Almost 1,000,000 Liquid Eye indicators sold to date!

"I am planning for a trip to Europe during June, July and August for the purpose of getting in touch with the International Institute of Refrigeration, in Paris, France. On my return I will pass through New York and stop there from the 28th to the 31st of August. I would be very pleased to meet members of the NAPRE either in Europe or during my brief stay in New York."

An Aussie member, J. Kenny, Engineer, J. Wildridge & Sinclair, Pty. Ltd., Sydney, corresponded with our national President, Leroy Etzel, as follows:

"Many thanks for your letter, certificate and membership card. I welcome the opportunity of participating in the activities of the Association and am looking forward to the arrival of Industrial Refrigeration which I will freely circulate.

"You may remember that I have been striving to interest many of my fellow engineers in becoming members with a view to forming a chapter here or some linkage between our Refrigeration Institute and your goodselves — so far, with little success. Incidentally, my chief here is interested in membership — you might enclose the necessary forms and information.

"Also, I have had a copy of Basic Refrigeration for quite sometime and might mention that it has been adopted as a Text Book for students at the Technical College.

"May I suggest that special articles and sheets from the Operating Data Books of previous years and Industrial Refrigeration be made available in loose leaf form, say 7" x 9", so that members may make a ready reference of items of special interest in conjunction with Basic Refrigeration — I have had to retype many sections, redraw sketches and charts for my own purposes."

Etzel was also privileged to receive a second letter from another Sydney member, F. G. Minister. He wrote, "I acknowledge with thanks receipt of your communication of 7th February advising that my application for membership of NAPRE has been accepted.

"I also acknowledge the Certificate of Membership, and as suggested, will do all in my power to carry out the functions of the Association and take advantage of all the educational facilities offered, and now look forward to a very happy membership with you. Thank you for your kind remarks."

Cuban member Rolanda A. Diaz, Engr. & Vice-Pres., W. M. Anderson Trading Co., S.A., of Habana, writes, "Thank you very much for your letter of February 17, which I have delayed in answering because I wanted to give you more definite information about the forming of a chapter in this area. However, I am sorry to say that at present I cannot yet say anything in definite. I shall keep your letter before me and will write you in more details within a few days."

Still another, Wm. C. Maher of New York City had these remarks for us: "Received your letter regarding Mr. R. F. Redlich of Lima, Peru, and though I would like very much to meet him when he passes through New York City it would have to be in some other place than the Airlines Terminal plant, as I am not with the firm which operates that plant. I am now running an ammonia plant (Kervan Co. — 119 W. 28th St., New York City). It is a 30 ton job (1928) — no trouble no headaches — come and go as I please so long as temps are down. These people are suppliers for florist equipment. Have one 12 ton York — 18 ton Buffalo — quite a drop from 1848 tons trichloromonofluoromethane with about 4000 hp various size motors — to 30 tons NH_3. But at least I have peace of mind and am my own boss."

Received remittances early in January from Harry J. Wood, Winnebago, Minn.; Guy McMillin, Pocatello, Idaho; Howard S. Bennett, Courtland, New York; Gustave L. Beinert, Ossining, New York and From the faraway Pacific, Filadelfa Tugade, Santa Cruz, Philippines.

Other correspondents heard from include John Nachtigall, Superior Ice Cream Co., Superior, Nebraska and E. East from down under in Auburn, New South Wales, Australia, who writes that he is now associated with the Sydney Meat Preserving Company.

Tampa Becomes Second Florida Chapter

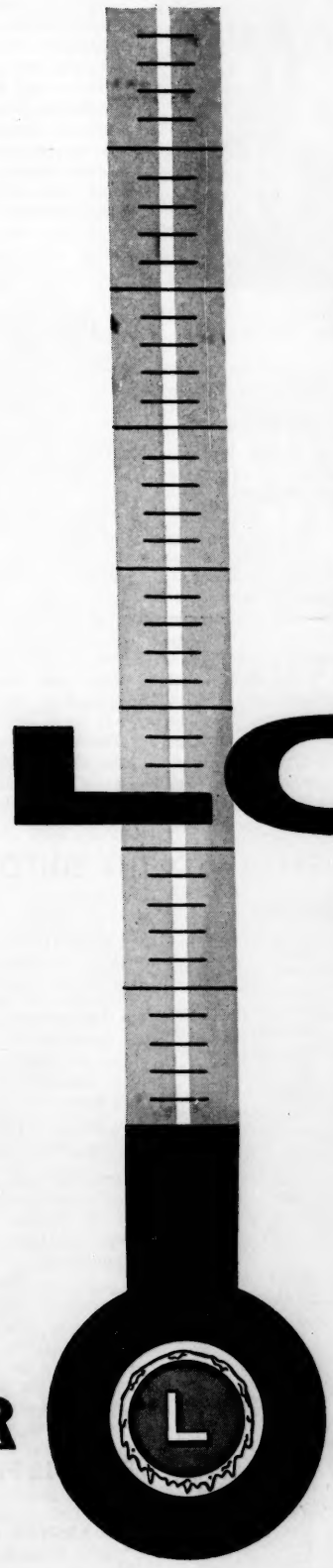
TAMPA affiliated with the National Association of Practical Refrigerating Engineers on Thursday, March 15, at a dinner meeting at the Crystal Ball Restaurant, 5013 Bayshore Boulevard, Tampa, Florida. A charter, granted by NAPRE's Board of Directors at Los Angeles' Convention in November 1955, was presented by Leo J. Vivien, a Past President, and Secretary to the Engineers Examining Board of New Orleans.

Assisting in the initiation of new Tampa members, the presentation of the Charter, and the installation of the Chapter's first officers were Geo. B. Bright, Sr., a National Honorary Member, Detroit, and C. W. Moneypenny, Chief Operating Engineer, Kenilworth Hotel, and Secretary, Greater Dade County Chapter, chartered last year. Henry Fraginal, American Chemical Co., Miami, Chas. B. Gilbert, Retired, Detroit, and Martin R. Smith, Southern Brewing Co., Tampa, completed the ceremonial team.

Officers of the Tampa Chapter are C. Scott Johnson, owner, C. S. Johnson Company, president; Robert T. Seiden, operating engineer, Borden's Dairy, vice-president; Frank F. Guida, owner, Gulf Ref. Serv., secretary-treasurer; Joe Bustelo, engineer, Southern Equipment Co., 2nd vice-president; Frank R. Goulding, engineer, Ross Manufacturing Company, corresponding secretary; Fred L. Goodwin, Sr., Superintendent, Seven-Up Bottling Company, sgt-at-arms. The directors of the chapter are John G. Holzberger, A. C. Patterson and Ellis W. Youdal. The chapter

Principal Chapter Officers at Tampa pose for the first "official" picture. Frank R. Goulding, Corr. Sec'y., Frank F. Guida, Fin'l. Sec'y. & Treas., C. Scott Johnson, Pres., Robt. T. Seiden and Joe Bustelo, Vice-Presidents.

Leo J. Vivien, a past National President of NAPRE, presents a gavel to C. Scott Johnson, first President of the Tampa, Fla., Chapter. Presentation was made at dinner meeting of the Chapter while local officers looked on.



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LOWEST in operating costs, too! Kramer's new "L" THERMOBANK saves important dollars every day it works for you. It's the only LOW temperature automatic hot gas defrost system that works trouble-free at any temperature level, from plus 32° to minus 75°. Let us prove that it costs less to own the best!

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KRAMER **THERMOBANK**

KRAMER TRENTON COMPANY
Trenton 5, New Jersey

Many members and their ladies joined the Tampa Chapter Directors and Officers (front row) for a Charter Night photograph. Ceremonies took place on March 15.

instructor is R. L. Rhodes and G. L. Carter of Brewster Vocation School acts as advisor to the Tampa Educational Committee.

Vivien, colorful New Orleans Chapter Secretary, was the National Deputy of President Leroy Etzel, in the Chartering Ceremonies. With true Southern flourish, he successively initiated the new members, presented the charter, and installed the first officers. Although he opened his remarks with "Lord, fill my mouth with worthwhile stuff, and nudge me when I've said enough," and never felt the "nudge" ("everyone was quiet and polite"), his "assistant" Geo. Bright wrote that Vivien's feet indicate he's on them every day, and not on a hard chair.

George Bright, 35 years a member of the association, briefed the new Tampa members on the history of the Association. Objectives of the Association were reviewed and emphasized by Charles Moneypenny. Fred L. Goodwin, Sr., sgt-at-arms, of the Tampa Chapter made the responses for the members as they gave their pledge of membership.

Following the initiation procedure Deputy Vivien presented the charter and followed it immediately with the installation of the chapter officers and directors. When he installed President C. Scott Johnson, Vivien presented him with a hand-tooled gavel. This gavel was manufactured by Junior Past President Regis Gubser and awarded at the Los Angeles Convention to Tampa as second place prize in a charter race during 1955. The gavel carried special significance since it came from the handrail of a vessel wrecked off the Florida Gulf-coast years ago and salvaged by Gubser's grandfather.

Following the officer installation, Martin R. Smith, the member considered most responsible for the formation of the Tampa chapter, presented membership certificates to all the charter members present.

Other speakers participating in the affair were President of the Southern Brewing Company, Gene Warnstedt and Sam Graziano of the Typhoon Prop-R-Temp Corporation. Mr. Womack, business agent for the International Union of Operating Engineers also addressed the group. Among the lady guests were Mesdames Vivien, Bright, Gilbert, and Moneypenny.

Following charter ceremonies the chapter promptly returned to its routine on March 29 with regular meeting at 8 p.m. at Bordens' Dairy, Tampa. First subject for discussion were results of the test on that portion of the book covered to date. The questions were all taken directly from the book and should have been answered by all who had studied diligently. After some discussion of the answers to each question, it was felt that a review should be in order.

Second subject for discussion was a new member drive. Now that the charter had been presented we felt that it was proper that new members should be sought, and with the new members we should begin a new course of instruction. This will permit those of our present members who are not fully conversant with the subject matter of the book to start over again.

Third subject for discussion was the possible change in the personnel of the examining board of the City of Tampa so that the refrigeration industry might be represented. Consensus was that the installation of refrigeration equipment should be allotted to the refrigeration installation crew rather than to some of the other trades. This would require some changes in the present methods and it was thought that a new or an amended ordinance would be required. Our second vice-president, Joe Bustelo, was asked to head the committee to consider this subject, and to report to the next meeting the committee findings. All present enjoyed coffee and cakes which were provided by the Entertainment Committee.

Colton

HARRY BONTER

OUR MARCH 14 meeting was held at the Santa Fe Ice Plant lunchroom, with a class lesson on store room insulation from Guy R. King's convention report and from a recent report by ASRE. F. J. Scherer went into quite a lot of details on the blackboard showing the temperature gradient through the insulation (various temperatures at the different layers of insulation from the outside temperatures to the room temperature). This involved quite a lot of discussion on the type of insulation to use.

It appears that a lot of the members took on too much of the ham dinner last month and could not make the meeting this month. The attendance was smaller than usual, about one third of members present. J. H. Mairs announced that he has made arrangements for the members, friends and wives to make a trip through the southern California Edison Co.'s new steam plant at Etawande, West of San Bernardino. The meeting closed with the usual lunch.

LETTERS TO THE EDITOR:

A Boost For Stoecker

KNOXVILLE, TENN.

I WANT you to know that I certainly enjoyed W. F. Stoecker's two articles on ammonia recirculation and return systems, and the January 1956 reply and data by W. V. Richards on surge drum velocities.

In fact the systems outlined are much like my own methods. The velocities so well explained by Richards (See Table 1) are almost identical to those I have used (shown below in Table 2). These were based largely on field observation and some careful temperature tests, as well as visual observations during tests at Worthington many years ago.

Both Tables I and II are based on a liquid droplet size of 0.0025 in. diameter.

Of course, considerations such as surge drum cost and competitive equipment affect actual selection. If you have reprints of the Stoecker articles and the January reply by Richards, they will be greatly appreciated.

WM. J. McCOY, JR.
Regional Manager,
Burge Ice Machine Company.

(Editor's Note: Reprints of the articles mentioned by Mr. McCoy have been gathered into a 32-page booklet, 6 x 9 inches, and are available from IR Reader Service Dept. at 50 cents each, postpaid.)

TABLE I — SEPARATION VELOCITY IN AMMONIA SYSTEMS EMPLOYING INTER-COOLERS, FLASH COOLERS. ETC.

Temperature	Fpm
minus 40 F	276
minus 20 F	210
0 F	157
plus 20 F	134
plus 40 F	110

This table by W. V. Richards, H. A. Phillips & Co.

TABLE II — SEPARATION VELOCITY IN AMMONIA SYSTEMS EMPLOYING INTER-COOLERS, FLASH COOLERS, ETC.

Temperature	Fpm
minus 25 F & up	200
0 F	150
plus 35 F	125

This table by Wm. J. McCoy, Jr., Burge Ice Machine Company

Freon 12 Findings

Wilmington, Del.

IN ANSWER to Question No. 1084, in your December 1955 NAPRE Question Box, the new thermodynamic properties tables for "Freon-12" refrigerant will have

no practical effect on current equipment using "Freon-12", from the operating engineer's standpoint. They will be of interest, however, to the design engineer, for whom they provide more complete and accurate data.

In the saturated region, for example, the new tables list thermodynamic properties for every degree of temperature from −152° F to the critical temperature of 233.6° F, which should eliminate interpolation required under earlier tables which listed only 118 temperatures. In the superheat region, the new tables include 133 constant pressure tables as compared with 78 tables in earlier version.

In the practical refrigeration range, difference between the new and old tables are slight. For example, the vapor pressure in the new tables in within 0.1 percent of that listed in the earlier ones. For the standard cycle of 5° F evaporation and 86° F condensing, the net refrigeration effect is 1 Btu/lb. less in the new tables and the saturated vapor volume at 5° F is about 3 percent less than before.

Properties listed in the new tables are complete, continuous, and consistent throughout the entire range of temperature and pressure. Earlier tables were developed from two different sets of equations, which resulted in some overlapping of data and a slight discontinuity in the properties.

F. R. Zumbro
E. I. duPont deNemours & Company.

Reason For Tampa Chapter

Tampa, Fla

AFTER THE NAPRE charter presentation here last month, Past National President Vivien wanted to know what brought the Tampa Chapter into existence. There were two reasons; the Veterans and the craft unions. Being a member of both groups, I had observed that locally the veteran who had acquired some knowledge of engineering had no opportunity to further himself along that line. At Tampa he could go to a business school. That was all the community provided.

Being part of the training program in the Navy at one time I understood these men pretty well. In much the same manner as Emerick, the author of Basic Refrigeration and Air Conditioning (and as for years I have read the journals and periodicals he recommended), I began to think along the same lines as he regarding the future.

But where to find an organization to fit that situation? The unions no longer have an apprentice program; Veterans organizations are politically minded; most vocational schools are mired down in politics; and only the larger companies have a training program. As I was receiving copies of Industrial Refrigeration, I began to see where through NAPRE we could have a pool of trained men in any given locality that industry could draw from for the future. It was with this in mind that G. L. Carter and I based our actions hoping that in the future he could present an apprentice engineer's program at Brewster's Vocational School.

It would also help in this way: Since the unions have no skilled men available, if a situation could be created where labor and management could actually co-operate in a training program, both could benefit to a great extent. Another industrial headache could be solved: Supervision, according to Mill and Factory, page 79, March '56, is where the greatest amount of labor trouble comes from. These supervisory positions are full of men who are incompetent and inefficient. They attained these positions through vacancies caused by war and seniority. I know chief engineers who think energy is vitamin pills, but this situation can be remedied in our field through education.

There are quite a few local chapters of veterans organizations who have contact with industry locally through the Chamber of Commerce. I believe we can obtain help from both groups. We intend to operate along that line in the future.

You not only would be surprised, you would actually be amazed at the improved labor relations here between employee and employer. Management was a little skeptical at first as they were somewhat influenced by their sales forces who seem to have created a small ivory tower of their own wherein they dwell; but management has begun to see the light.

There is a tremendous field here in Florida for future expansion in the citrus industry. They don't use boilers. They use ammonia and run the head pressure up and use the hot gas for evaporators and heating, which really is nothing more than

heat pumps in a large scale industrial application. The Lake Okeechobee region will have a great potential in the frozen food line. Scott Johnson, Tampa Chapter President, NAPRE, is in direct contact with most of these citrus plants. A lot may be accomplished there in the future.

MARTIN R. SMITH
Southern Brewing Co.

(*Editor's note: Universities and Industries in the United States are alarmed at the increasing shortage of engineers. Recently, at the Convention of the American Society of Tool Engineers at the International Amphitheatre in Chicago, T. C. Gleason, Assistant Chief Engineer, Chrysler Corporation, put the nation's need at 50,000 for engineers. It is therefore, indeed gratifying to receive a letter such as this from practical personnel and to note their ambitions toward improving and upgrading themselves in an effort to help industry and our nation fill these needs. This letter could be said to be typical of the attitude of the new chapters forming in NAPRE and other practical engineering groups.*)

New Insulated Container

NORWEGIAN State Railways are testing a new insulated container for transporting frozen foods, especially fish fillets. The container, weighing one and a half tons, using dry ice, is built to handle more than four tons of food.

Fish Block Water For Air Conditioning System

AIR conditioning maintenance personnel detected something fishy in The Chicago Tribune's air conditioning system the first week in April. They found it was smelt. When unseasonal heat and humidity hit the windy city on April 2, Tribune maintenance personnel turned on the gaint cooling system to combat the 79 degree heat. Although the system normally has a cooling capacity equivalent to melting 3,400,000 pounds of ice a day, nothing happened.

Sensing something fishy, the men checked two huge intake pipes, which draw water for the system from the Chicago river. They found the openings plugged with smelt. Thousands of the tiny fish were plastered against the heavy ½ inch wire screen protecting the 16-inch opening through which water is siphoned into the system from 14 feet below the river's surface. The fish prevented water pumps from maintaining their prime. The cooling system couldn't operate. And employees working in Tribune Tower, adjoining newspaper production plant, and WGN studios, sweltered in the record heat wave.

National Tea Merged With World Wide Concern

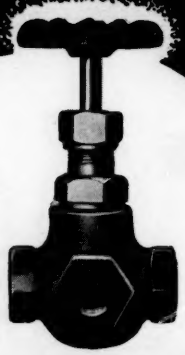
NEW OWNER of the National Tea Company, Garfield Weston, Toronto, Ontario, multi-millionaire, disclosed in Chicago in March that the American firm is to be merged with the Loblaw Grocery Chains in the Eastern United States and Canada. The new firm will be third in chain store operation size to A & P and Safeway Stores, Such a merger, as announced, would make National Tea part of a world-girdling enterprise, consisting primarily of baking operations with the grocery operations running the bakery enterprises as a close second.

Tea Council Furnishes Iced Tea Posters

THROUGH joint promotional activities with the Tea Council the National Association of Ice Industries has made available to members again this year, four-color iced tea posters. They are 20½ × 30½ inches, ideal for use on trucks, vending stations, plant platforms and other places where the public will see them. These posters are available free through the National Association.

Efficient Designs For Long Life And Low Maintenance

SHANK AMMONIA VALVES



Shank Valves have earned a reputation for high quality, long life and dependable products.

Built of highest grade materials with close tolerances —will stand most rigid inspections.

Largest line of Ammonia All-Steel Bar Stock Valves in the industry. Completely Cadmium plated.

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First Flight at 86

HARRY SLOAN, well known refrigeration engineer, affiliated with the Vilter Manufacturing Co., Milwaukee, since 1914 had his first airline flight when he departed from Milwaukee, March 10, for Los Angeles. Nothing unusual about flying these days but Mr. Sloan had his experience following the observance of his 86th birthday in October 1955.

Harry Sloan, Milwaukee, Enjoys First Air Ride at 86

Mr. Sloan is a past president of the American Society of Refrigerating Engineers and is widely known in the industry for many advanced ideas now being used and is the holder of a number of patents in the refrigeration and air conditioning field.

Mr. Sloan is recuperating from severe injuries received in an auto accident last November and his visit to the Pacific Coast is intended to hasten his recovery. Up until the time of his accident, Mr. Sloan had been active in his capacity as Advisory Engineer to the Vilter Company, usually vacationing from May to August during which period he pursued his favorite pastime of raising and harvesting a large variety of fruits and vegetables.

Mr. Sloan became a member of Mecca Temple of the Shrine in New York City in 1896, the first Temple in the United States and from which the organization spread throughout the country.

Sydney Storage Destroyed

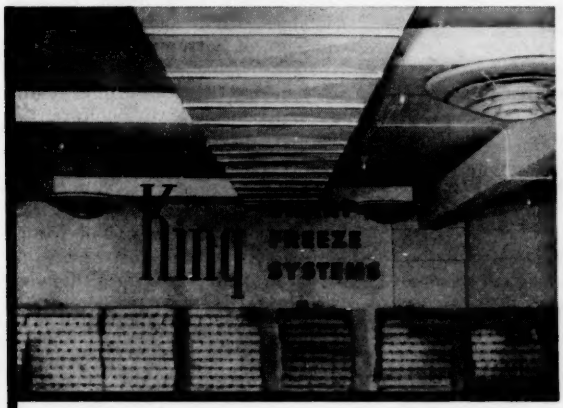
A DAY-LONG fire destroyed a seven-story cold storage building near Sydney's dock area, Australia. A company spokesman said the building contained nearly $8,400,000 worth of food.

Directory of Refrigerated Warehouses Now Available

THE NATIONAL Association of Refrigerated Warehouses announced that its 1956 Directory of Public Refrigerated Warehouses is available now, at no charge to firms which use the facilities of Public Refrigerated Warehouses. The Directory, published annually by NARW as a service to its members and the perishable foods industry, is a comprehensive guide to public refrigerated warehouse space, local, national and international.

The book contains detailed listings of all NARW member plants, including storage space capacity (freezer and cooler) personnel, railroad lines, insurance rates, investment figures and special services rendered by the individual plants. Included also are detailed listings of NARW associate members, well known suppliers to the perishable foods industry.

NARW says that this year's edition is the biggest and finest edition ever printed. Advance requests indicate demand for this year's Directory will be extremely heavy, and storers of perishable foods are urged to send in their requests now.



Adaptable to any cold storage needs

King Sharp Freeze systems are designed and engineered for your requirements—pre-cooling, freezing or cold storage of foods—for cold storage warehouses, storage freezers, blast freezers, coolers, freezing tunnels—for ammonia or freon refrigerants. King systems in more than 400 food plants here and abroad are proof of King leadership in more than 50 years of air movement engineering.

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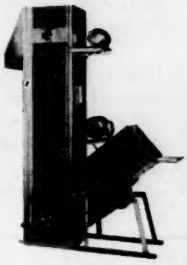

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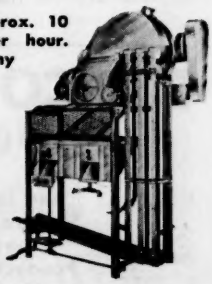
will deliver approx. 10 tons of ice per hour. Works with any Crusher.



BATEMAN LOADER-CRUSHER

Crusher ice unit saves time and labor costs. One man can do work of two. Storage bin under crusher will hold 100-lbs. of ice.

Bateman
Ice Processing Equipment

SEE YOUR DEALER or WRITE FOR INFORMATION

MINERAL WELLS, TEXAS

Frozen Food Packers Look For Big Increase in 1956

SALES planning in the frozen foods industry is stabilizing on a volume objective in the neighborhood of 15 percent above 1955 totals, according to Lawrence S. Martin, secretary-manager of the National Association of Frozen Food Packers.

"If consumer demand and the industry's ability to produce were the only two considerations with which frozen foods had to contend," he said "a straight line could be used to describe the sales goal of the industry for 1956. This line could be drawn nearly straight up, like the path of a space ship, to almost any point you would want to name."

Other Factors

There are other factors, however, which enter into the picture and force the industry to adopt a more modest trajectory on its sales chart, Mr. Martin commented. Chief among the factors serving to deter a more rapid expansion, he said, is the same one which prevailed during the earliest days of the industry — a shortage of retail display space.

"Whereas 25 years ago frozen foods were still an unknown quantity to consumer and retailer alike," he said, today they enjoy a high degree of consumer acceptance, evidenced by the fact that in 1955 more than half the American families were consistent frozen food purchasers, according to a survey by the Market Research Corp.

More Space Vital

"But the question which seemed to be interwoven throughout the proceedings of last month's National Frozen Food Convention in New York was whether the retailer, key man in the problem, was sufficiently sold on frozen foods — not as products, but as money makers for him. This led, inevitably, to the question of what the frozen food packer and the wholesaler can contribute to the selling job."

The MRC survey showed, for instance, that in 1955 there were frozen food cabinets in 270,000 grocery stores. These represented 69 percent of all grocery stores but, more significantly, accounted for 93 percent of total grocery volume. The same report however, had a discouraging aspect — average footage of cabinet space per store last year was 40 feet, and individual retailers said that they need, on an average, nearly double the space to do an adequate merchandising job on frozen foods.

"The frozen food industry" Mr. Martin said, "is taking action to combat this deficiency and it is possible, depending on the degree of success, that the 1956 sales goal may be raised as a result. Here are some of the points which the packers want retailers to know:

Points for Retailers

"1. Frozen foods provide the retail grocer with a better than average margin of profit.

"2. Attractive frozen food displays attract better customers, who spend from 30 percent to 80 percent more for groceries than non-buyers of frozen foods.

"3. That a turnover analysis of frozen food operations will demonstrate the bigger profits they can get from fast turnover, and will result in generally more efficient operations."

Principal target of the industry, the processor spokesman said, is the independent grocer who has, on the average, less cabinet footage than the chain operator. The MRC survey pointed out that, while 92 percent of all families do some shopping in independent stores each month (compared with 72 percent for chains), the independents are not getting their share of heavy week-end traffic in spite of a decided advantage in convenience of location. According to the report, the advantage which chain stores hold over independents on the week-end is more pronounced in frozen food sales than in other heavy volume food items tested.

"But in spite of the feeling that more can be done to encourage a greater volume of retail sales," Mr. Martin added, "the frozen food industry is hardly pessimistic about its prospects. Industry leaders regard an assured 15 percent growth as highly acceptable and feel that it places them in an enviable position in relation to other industries. This, they feel, is particularly true when favorable signs of industry maturity are considered. Such signs include":

Favorable Signs

1. An indication of steady progression in the sales curve of the 'staple' frozen food items, such as vegetables, fruits and juices. There is no sign of having reached a 'sales plateau.'

2. The fact that, according to the U.S. Department of Agriculture, the prepared frozen food segment of the industry has just enjoyed a 67 percent increase during 1955 — with no sign of a let-up.

3. The fact that new and formidable factors are entering the field of marketing with pre-cooked dinners.

4. The fact that increased interest is being shown in the so-called 'luxury' frozen food items such as pheasant, hors d'oeuvres, egg roll, soup and nationality dishes.

DIMCO CAST ALUMINUM FIN EVAPORATING COIL

The Ideal Refrigeration Surface for Cold Storages, Freezer Plants, Dairy Products, Packing Houses, Abattoirs, Breweries and numerous applications

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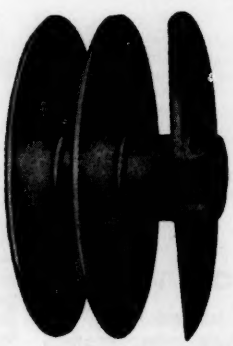

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★ *Saves Cost*

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Indiana-Ohio-Michigan Joint Convention

A JOINT convention of the Indiana, Ohio and Michigan Ice Associations was held at Detroit January 30 to February 1. Starting with a "Get-to-Gether Party" in the English Room of the Detroit Leland Hotel, compliments of Detroit City Products Corporation and Borin Brothers of Detroit, the convention picked up momentum and gave all delegates full measure for their time and money until the final adjournment.

Monday's National Regional Conference, directed by C. P. Austin, of the National Association, gave full measure of Mr. Austin's wealth of experience concerning the latest developments in the Industry.

Tuesday morning an interesting tour was conducted through Detroit City Products Corporation and Borin Brothers ice plants where the very latest in ice processing and hand-vending were demonstrated. Another interesting trip was through the Gobel Brewery where a dutch lunch was served.

Tuesday afternoon was devoted to new developments in plant operations, vending and retail outlets for ice. Two of the subjects were handled by Indiana ice men, Henry Dithmer of Polar Ice & Fuel Company, Indianapolis, on Ice Plant Operation, and Dave Barnes of Barnes Ice & Fuel Company, Gary, on Retail Outlets for Ice.

Wednesday morning highlighted specialized markets for ice, featuring talks on ice carvings and punch bowls, corn icing and channel icing.

City Products Earnings Best Since 1950

CHAIRMAN and Chief Executive Officer of City Products Corporation, Chicago, William J. Sinek, reported in March that City Products net income for 1955 was $4,130,709, or $3.30 per share. This compared with the net income of $3,538,445, or $2.82 per share for 1954. These earnings were the highest since 1950.

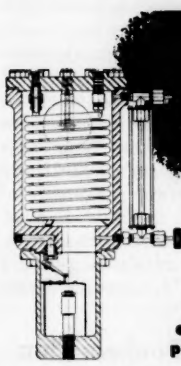
The 1955 report showed cash assets of the firm at better than $14 million and a working capital of equal amount, while a long term debt was reduced more than a million dollars from the year previous. Sinek said his company was pushing its program of expansion in the refrigeration, dairy, brewery and the natural resources field.

North Carolina Convention

THE North Carolina Association held its 47th Annual Convention and National Association of Ice Industries held the second Regional Conference of the 1956 series, March 12 and 13. Both meetings were held at the Sir Walter Hotel in Raleigh, North Carolina. Highlights of the Convention included an address by North Carolina's Governor, The Honorable Luther H. Hodges, and an afternoon question and answer session on the 1956 Wage-Hour Law by NAII General Counsel William T. Jobe.

The 1955 officers of the Association were all re-elected for 1956. They are: A. J. Brinson, Lumberton, president; V. E. Boomer, Rich Square, vice-president; and Lewis H. Powell, Raleigh, secretary and treasurer.

Tuesday, March 13 was devoted to the Regional Conference. D. M. Howell, NAII Member of the Board of Directors from Greensboro, served as moderator. The conference was well attended. It was a round-table discussion of management problems. C. P. Austin of NAII presented an array of photo-slide material dealing with important Industry problems.



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- Full automatic gas flow to condensing coil.
- Full automatic air discharge.
- No adjustments necessary during purging.

Armstrong forged steel purgers with automatic air and non-condensible gas discharge relieve engineers of guessing as to when the system is completely purged. Unit allows only non-condensibles to escape, saves on refrigerant.

Since no adjustments are required during operation, the engineer is free for other duties.

The purger can be operated continuously or intermittently. Send for free 4-page Bulletin No. 2211—Learn how Armstrong Purgers cut refrigeration costs, write:

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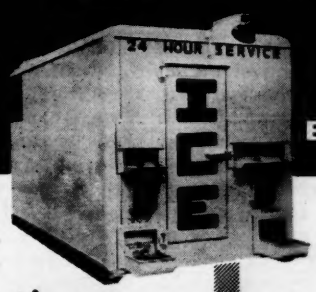
860 Maple Street • Three Rivers, Michigan
Satisfaction Guaranteed

Better check on Armstrong High Side Floats and Liquid Seals, too!

S & S



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A.S.R.E. Annual Meeting

THE 52nd Annual Meeting of The American Society of Refrigerating Engineers will be held June 4-6 at the Hotel Sheraton-Gibson in Cincinnati. Some 700 delegates, guests and other representatives of the air conditioning and refrigeration industries in the United States and Canada are expected to attend. Installation of newly-elected officers, technical sessions and conferences, forums, symposiums, social and educational activities are on the meeting agenda.

C. M. Ashley, chief staff engineer for Carrier Corp., Syracuse, N.Y., will be installed as president at a welcome luncheon on June 4. Other officers to be installed are H. F. Spoehrer, St. Louis, first vice president; Cecil Boling, West Hartford, Conn., second vice president, and D. D. Wile, Los Angeles, treasurer. Directors who will be installed for three year terms are: C. T. Hamilton, Vancouver, B.C., Canada; Robert G. Werden, York Corp., Philadelphia; John Engalitcheff Jr., Baltimore Aircoil Co., Baltimore, Md., and Everett P. Palmatier, director of research at Carrier Corp. Walter Cooke, American Blower Corp., New Orleans, will fill the unexpired term of D. D. Wile as Director.

Shortage of Workers A Boost for Automation

(Continued from page 3)

row "should be a leader, not a problem, in the matter of getting along with people," he said, adding that "knowing and using the laws of human relations is just as important to his progress as his ability to get physical materials and the laws of nature to work for him. It is also important that engineers be sales-minded. That involves an understanding of merchandising, the purposes of advertising, and of the job of selling, itself."

Regarding automation, Newberg said he feels that "every engineer should have a full realization of how urgent it is for us to do everything in our power to accelerate its applications and widen its scope. Also because automation is so often misunderstood, and thus frequently misrepresented and criticized, we of all people should be fully prepared to explain it and acclaim its benefits."

AWA-NARW Convention

(Continued from page 23)

tours. These extra events were well attended, evidencing the sincere interest of warehousemen in acquiring proper knowledge and information of their industry.

Associate Members Show Exhibits

Many NARW Associate members taking advantage of the membership benefit, exhibited at the 65th Annual Meeting. These displays were located on the mezzanine floor adjacent to the meeting rooms and were staffed by sales and engineer representatives. Firms participating were Arctic Feather and Down Company, Bloomfield, N.J., Armstrong Cork Company, Lancaster, Pa., Carrier Corporation, Syracuse, N.Y., Clark Door Company, Newark, N.J., Edw. M. Jones & Son, San Francisco, Calif., Freezing Equipment Sales, Inc., York, Pa., Frick Company, Waynesboro, Pa., King Company, Owatonna, Minn., Lewis-Shepard Products Inc., Watertown, Mass., Moto-truck Company, Cleveland, Ohio, Pacific Intermountain Express, Oakland, Calif., V. C. Patterson & Associates, York, Pa., Pittsburgh Corning Corporation, Pittsburgh, Pa., Refrigeration Engineering, Los Angeles, Calif., Sten-C-Label, Inc., St. Paul, Minn., J. H. H. Voss Company, Inc., New York, N.Y., York Corporation, York, Pa.

Merchandise Division Associates also participated.

UL Facilities for Testing Refrigeration Equipment

(Continued from page 34)

has a pressure limit of 6600 psig and the other a limit of 20,000 psig. This particular type of pump was selected because the output pressure can be adjusted easily within very close limits by controlling the input air pressure and because, once the pressure is adjusted, it will automatically be maintained — but not exceeded — even when the device under test stretches or the fittings leak.

Rain test equipment installed along one end wall of the laboratory is constructed in accordance with the specifications of Underwriters' Bulletin of Research No. 23, entitled, "Rain Tests of Electrical Equipment — Methods and Apparatus." This equipment is used principally for rain tests of room air conditioners and equipment to be classified for "Outdoor Use".

This new laboratory represents an increase of 400 percent in the capacity of test rooms for heat-loading air conditioners and other refrigeration equipment and an increase of approximately 600 percent in locked-rotor test circuits. These have been the two biggest bottlenecks in former facilities. It also represents a considerable improvement in hydrostatic test facilities and in metering methods. Already in the few months these new "Hot Rooms" have been in use, Underwriters' Laboratories, Inc. has vastly speeded up service to clients and, of course, when the "bugs" are all worked out and technicians have learned to take full advantage of the increased test capacity, Underwriters' Laboratories, Inc. should improve service to its air conditioner and refrigeration equipment clients even more.

Frozen Food Packers Plan Industry Wide Advertising

THE NEED for an industry-wide frozen foods advertising campaign was emphasized at the closing session of the National Frozen Food Convention. The importance of such a program was stressed during the round-up session's executive board meeting headed by John M. Fox, Minute Maid president.

Company officials participating in the board meeting agreed a "tremendous job" had to be done in promoting frozen foods and called attention to similar campaigns successfully waged by processors of cottage cheese, the American Meat Institute and the baking industry.

News of People

Crystal Ice Directors Up Turner to V.P.

THE BOARD of directors of the Crystal Ice & Cold Storage Co. at a meeting in Phoenix elected G. E. "Mike" Turner a vice president according to W. F. Asbury, president of the 43-year-old refrigeration organization. Crystal Ice operates nine plants in the Salt River Valley at Phoenix, Mesa, Glendale, Chandler and Cashion. Re-elected at the same meeting were Asbury; D. H. Green, senior vice president; A. R. Carlson and W. F. Zeidler, vice presidents; F. E. Wille, secretary-treasurer, and R. T. Corbett, assistant secretary-treasurer. Turner, 45, a native West Virginian, joined Crystal Ice in 1948 as retail sales manager. He was advanced to commercial sales manager in 1951.

Crystal Ice and Cold Storage Co. is a subsidiary of City Products Corp., Chicago. City Products, listed on the New York Stock Exchange for many years, is both a holding and operating company with business interests in 28 states, Canada and Mexico. Nationally-known William J. Sinek is chairman of the board and chief executive officer of City Products Corp. whose companies operate ice and cold storage plants, dairies, breweries, fuel oil and coal companies, and numerous producing gas and oil wells. City Products acquired a majority interest in the Crystal Ice and Cold Storage Co. in 1941.

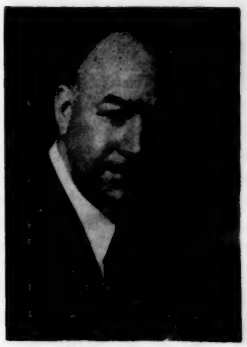
During the past eight years Crystal Ice Company, long a major factor in the western refrigeration industry, has expanded dramatically to meet the trend toward field packing and vacuum cooling of perishable agricultural products grown in Arizona's lush Salt River Valley.

MINUTE MAID has appointed John A. Podmore as assistant vice-president in charge of administrative services. Harold Emerson, formerly of Seabrook Farms, has taken over as director of traffic and warehousing. Ralph A. Clark will take over Mr. Emerson's former position of manager, home office sales.

GAY A. ROBERTSON SR., chief engineer for the Atlantic Ice and Coal Co. for 34 years, until his retirement in 1948, died March 22 at his home in Atlanta, Ga. He was a member of the American Society of Refrigeration Engineers.

Dabbs Joins Skipwith

SHELBY SKIPWITH, INC., Memphis, announced in March, the affiliation of John T. Dabbs as sales manager for the firm. Dabbs was formerly commercial sales supervisor for York Corporation in the St. Louis district office. Shelby Skipwith, Inc., is exclusive distributor for York Corporation refrigeration and air conditioning equipment for the Memphis and Tri-State area.

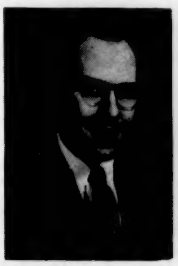


John T. Dabbs

Dabbs, a member of NAPRE, transferred his membership from the St. Louis Chapter, of which he was a past president, to Tennessee No. 1 at Memphis. In 1954, he was national membership chairman of that association, establishing one of the most enviable records for membership in recent years.

Dole Appointments

THE Dole Refrigerating Company, Chicago, announces the appointment of W. E. (Ned) Lauterbach to chief engineer. Formerly, Mr. Lauterbach worked on new products in the research and development department of the Dole Valve Company, Chicago. Previous service in the refrigeration industry includes serving on the staff of the Armour Research Foundation, as assistant supervisor of materials engineering, and later as chief engineer of the Albright Company.



W. E. Lauterbach

L. E. Gustafson

The Company also announces the appointment of Leonard E. Gustafson to district representative in Texas, Louisiana, and Mississippi. He will assist J. A. Wilkerson, field engineer, in Dole's South Central territory.

DEATHS

Frank Philabert

FRANK PHILABERT, former president of Chemical Solvent Company, Birmingham, Alabama, passed away Thursday, February 23.

Mr. Philabert had gained international recognition for his research and development in the fields of water and brine chemistry. The products manufactured by his company were of his own origin, among which are Solvex, Ultra Solvex and Distilex, which are in use throughout the world.

Born and educated in New Orleans, Louisiana, Mr. Philabert moved to Birmingham in 1916. After associations with several companies which benefitted by Mr. Philabert's various inventions and formulae, he founded the Chemical Solvent Company in 1935 and was president until his retirement in 1955. He was succeeded in the presidency by Noel Burkey, Jr., and in the management of the company by his daughter, Olivia P. Burkey.

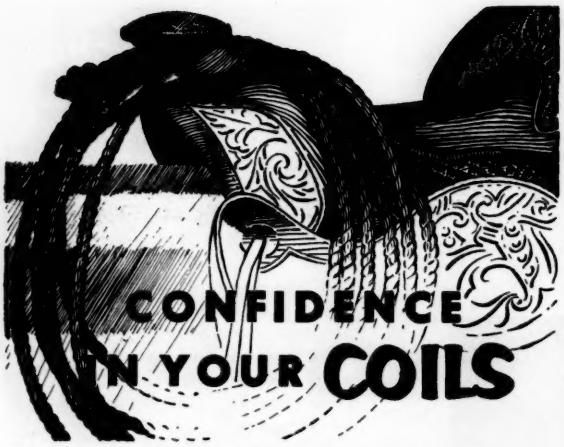
In addition to his daughter, Mr. Philabert is survived by his wife, Olivia Montgomery Philabert. Their son, Ensign Frank Philabert, Jr., USNR, was lost aboard the Submarine Shark in February, 1942.

William F. Luick

THE DEATH of William F. Luick of Milwaukee, who built a small ice cream shop into one of the biggest ice cream makers in the Midwest died March 6. He was 85. In 1897 with borrowed capital of $700 the young man rented a basement and started producing little batches of ice cream with a hand freezer. As the business grew he added to the ice cream plant and in 1925 the dairy business was incorporated separately. In 1927 both the Luick Ice Cream Company and the dairy company became divisions of the National Dairy Products Corp., and Mr. Luick remained as president of both divisions until he started spending most of his time in Florida about 1935.

ARTHUR E. REINHARDT, retired cold storage executive, New Rochelle, N. Y. died February 27 in a New Rochelle hospital after a long illness. He was 62. A past president of the Eastern Ice Association, Mr. Reinhardt formerly headed the West Farms Cold Storage Company in the Bronx, New York.

(Continued on page 61)



When it's a question of new refrigeration coils, it's no time to speculate on dependability or to compromise on quality. And where it's a question of assuring efficient, uninterrupted operation and low maintenance throughout the years —

NATIONAL
REFRIGERATION COILS

offer you the benefits of over 70 years' specialization in the pipe-bending field: experienced engineering and exact production, with smooth bends, perfect welds, and accurate measurements.

Whenever you need coils, write for our free tracing-chart which shows standard dimensions ready to fill in. It will simplify your specifications—whether for zig-zag or nested box or conical or round-flat or reducing coils.

NATIONAL PIPE BENDING COMPANY
162 RIVER STREET • NEW HAVEN, CONN.

Established 1883

York Executives Take Atomic Energy Course

S. E. LAUER, President of York Corporation, disclosed that in line with the Company's policy of offering training courses for its employees, a selected group of 150 executives, junior executives, and engineers has completed a course in Nuclear Power. Interest in the possibilities of application of atomic energy to peaceful uses in private enterprise was well demonstrated by the attendance of this group at a series of evening meetings in order to be better informed on the subject.

The course, prepared by the National Industrial Conference Board, is designed primarily for business executives who may not be scientifically trained, but who are concerned with future developments in the use of nuclear power for peaceful purposes. Although somewhat technical, the course as conducted and interpreted by Neil Hopkins, the corporation's Director of Research, enabled those in attendance to grasp the fundamental principals involved.

Hopkins, who holds both B.S. and M.S. degrees from the Massachusetts Institute of Technology, is a member of the Atomic Industrial Forum and recently completed a special course in nuclear engineering at the North Carolina State University.

Concerning the course, Lauer said that with the potentialities for application of atomic energy to peaceful uses in private enterprise, there is a need for a better understanding of this whole matter by industry.

American Service Expands Drive-in Stores

FURTHER progress was made last year in the transition of American Service Company's business from sale of ice to merchandising of other products. Fourteen new drive-in stores were installed and the number of such units in operation December 31 was twenty-six.

Net income for 1955 was $87,977 compared with $113,624 in 1954. An increase in net would have been shown for last year except for the recording of a provision for deferred income taxes in the amount of $39,000. Ice sales were $1,403,790, down $445,386 from 1954. The 11 percent decline primarily was attributable to the unfavorable weather in much of the company's operating territory during July and August and the shrinking market for block ice.

COMING CONVENTIONS

AMERICAN SOCIETY OF REFRIGERATING ENGINEERS
June 4-6, 1956
Sheraton-Gibson Hotel, Cincinnati
R. C. Cross, Exec-sec.

CANADIAN WAREHOUSEMENS ASSOCIATION
July 25, 1956
Digpy Pines, Nova Scotia
H. Cecil Rhodes, Managing Director

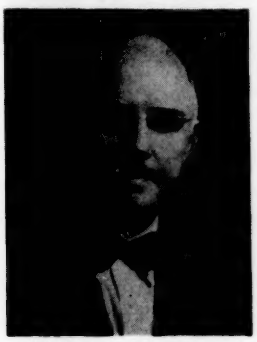
NATIONAL ASS'N PRACTICAL REFRIGERATING ENGINEERS
Oct. 29-Nov.2, 1956
Statler Hotel, Detroit, Mich.
J. R. Kelahan, Secretary

NATIONAL POWER SHOW
November 26-30, 1956
New York Coliseum, New York

INTERNATIONAL HEATING AND AIR CONDITIONING EXPOSITION
February 25 - March 1, 1957
International Amphitheatre, Chicago, Ill.

Robert C. Doremus

PROMINENT in the refrigeration and air conditioning fields in the Detroit, Michigan area and in the national picture, Robert C. Doremus, passed away on Sunday, March 18.



Robert C. Doremus

Doremus was chief engineer and secretary of the Detroit Ice Machine Company, and an active member of NAPRE and ASRE.

At Detroit, Robert Doremus had been a past president and the educational director of NAPRE's Chapter in that city. The chapter had bestowed an honorary life membership on him recently. He had also served for many years on NAPRE's National Educational Committee with the late Professor H. G. Venemann. He is the author of many papers presented before conventions of NAPRE and ASRE.

A graduate of MIT, Doremus was a registered engineer in the state of Michigan and had devoted his life to refrigerating and electrical engineering, except during the interval he served with the U. S. Army during World War I, when he held a Captain's commission. He was a member of the Engineering Society of Detroit and for a number of years served as the secretary of Detroit Section, ASRE. He is a past secretary of the St. Clair Yacht Club and member of the Detroit Power Squadron. He was also a contributing editor to the Heating, Piping & Air Conditioning magazine.

E. F. Swanberg

PACIFIC NORTHWEST Refrigeration Associations lost an ardent booster in the death of E. F. Swanberg, manager and chief engineer for the Diamond Ice & Storage Co., Seattle, Wash. Mr. Swanberg died suddenly at his home on March 25, on his 59th birthday.

Widely known in the refrigeration field, Mr. Swanberg was a member of the executive committee of the National Association of Refrigerated Warehouses and was a past president of NAPRE, Seattle Chapter. He represented the Chapter at many NAPRE Conventions. He was a former director of the Northwest Association of Ice Industries and also served as president and secretary of the Pacific Northwest Association of Cold Storage Warehousemen. He was a member of the Washington Athletic Club, University Lodge No. 141, F. & A. M., and the Moose Lodge. He was a First World War Army veteran and a past commander of University Post No. 11, American Legion.

Harold G. Hacke

THE DEATH of Harold G. Hacke, assistant to the president, The Union Ice Company, San Francisco, occurred April 6. He was treasurer of the California Association of Ice Industries and the Pacific States Cold Storage Warehousemen's Association. For many years he was active in the warehousing and ice business and in more recent years had taken an active part in his company's activities in the frozen food business.

OHIO SPECIAL ICE CANS

WELDED — RIVETED ICE CAN GRIDS

Industrial Trucks and Trailers

THE OHIO GALVANIZING & MFG. CO.
NILES — Established 1902 — OHIO

Polar
AUTOMATIC ICE VENDORS

Available in all sizes — with any combination of bag or cake conveyors. The investment is surprisingly low!

Write today for prices and details. Dept. IR

REFRIGERATION ENGINEERING COMPANY
MONTGOMERY • MINNESOTA

MANUFACTURERS' NEWS

York Corporation-Borg-Warner Merger

THE BOARDS of Directors of Borg-Warner Corp., Chicago and York Corp., York, Pa. in specially called meetings, unanimously approved the affiliation of the two companies, it was announced in Chicago, April 5. The affiliation would be effected under a Plan of Reorganization whereby Borg-Warner will succeed to all of the assets and assume all of the liabilities of York and each York common shareholder will receive one-half share of Borg-Warner common stock for each one share of York common stock. In addition, the York common shareholder would receive $2.00 in cash for each share of York common stock.

Recommendations for the affiliation were submitted to the two Boards of Directors by Roy C. Ingersoll, Chairman of the Board and President of Borg-Warner, and Stewart E. Lauer, President of York. Mr. Lauer will also recommend that the York shareholder approve the Plan at a special meeting to be held in June. The Plan also is subject to the approval of the requisite federal authorities.

"The affiliation with York is a part of Borg-Warner's carefully planned program of diversification," Mr. Ingersoll said. "Under this program, we will enter only a few new fields — select major growth industries to which we believe Borg-Warner can make a real contribution because of its particular engineering, manufacturing and sales knowledge and experience. We recognize that York Corp., through its preeminence in engineering, production and distribution has established itself over the years as a leader in the refrigeration and air conditioning field. When the plan becomes effective, York will be operated as a separate Division of Borg-Warner and we expect to continue the present policies, management and personnel of York. We believe we can achieve tremendous growth potential through the combined resources of our two organizations."

Mr. Lauer pointed out: "York Corp. has a major position in air conditioning for industry, institutions and office buildings from the smallest establishment to the largest skyscraper and in refrigeration principally for food processing and chemical industries. A considerable part of York's business relates to home air conditioning. Borg-Warner also has several divisions supplying other products for the home, including Norge's full line of household appliances, and Borg-Warner's Airline heating equipment, and these will complement York's home cooling systems." Mr. Lauer and Mr. Ingersoll agreed that distribution and expansion of product lines would be greatly enhanced by the affiliation of the two companies.

Borg-Warner's 1955 sales in diversified fields, including home appliances, automotive components, farm equipment, aircraft parts, oil field equipment, steel and plastics, totaled $552,192,430 with net earnings of $41,075,784. York's 1955 sales, including commercial and domestic air conditioning, commercial refrigeration systems and allied lines, were $82,713,623 and net earnings amounted to $2,426,236.

This merger affects one of the old line manufacturers of refrigerating equipment. Founded in 1885 by the late Thomas Shipley as the York Manufacturing Co., it entered the industry at a time large tonnage refrigeration equipment was finding a ready market in industrial fields such as the manufacture of ice, cold storages, meat packing plants, and breweries. The company first manufactured a compound ammonia compressor, consisting of two single acting high and low pressure pumps side by side, from patents held by W. G. Lock, an engineer of Sydney, Australia, the patents being issued as early as 1867. At the same time, it manufactured the St. Clair compound machine. In 1927 the company name was changed to York Ice Machinery Corp. and in 1943 to the York Corporation.

Vilter Appointment

THE appointment of Paul S. Staples as Assistant Manager of the New York office has been announced by The Vilter Manufacturing Company. Mr. Staples was

Paul S. Staples

previously employed by the Creamery Package Manufacturing Company for a period of 31 years, and as manager of their New York office for the past 23 years.

Mr. Staples comes to his new position with a wide circle of acquaintences in the industry.

Worthington Acquires Mason-Neilan

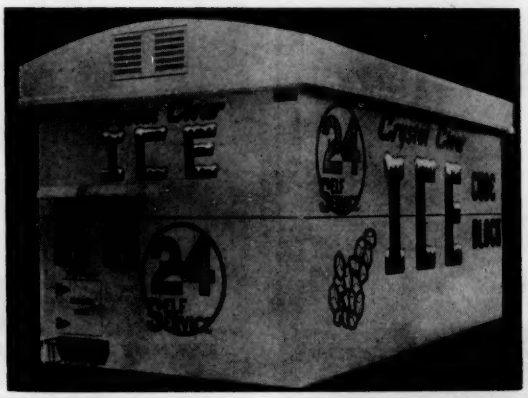
WORTHINGTON Corporation acquired Mason-Neilan Regulator Co., Boston on March 30. Mason-Neilan control valves and regulators, in conjunction with Worthington pumps, compressors, turbines and other types of industrial machinery produced by Worthington, are used in automatically controlled production systems. Mason-Neilan will be operated as a division of Worthington Corporation. The full line of Mason-Neilan products will continue to be manufactured, including instruments and valves designed to control the pressure, temperatures and flow of the liquids, gases and components incident to industrial processes. Among them are indicating, controlling and recording instruments, flow meters, diaphragm control valves, servomotors, pressure regulators, pump governors, filters and other specialties.

K. G. Brown Mfg. Co., Inc., Mattituck, N.Y.

PRESENTS:

The Most Modern Automatic Ice Cube Vendor.

- **Dispenses Cube, crushed, party and block ice**
- **Ready for immediate operation.**



The 8' x 16' station pictured here, vends 135 10-lb. bags & 60 25-lb. blocks

The new low-cost 6' x 8' station vends more than 85 ten-lb. bags.

Write today for complete details on this Double Unit and other sizes and models.

CATALOGS AND BULLETINS

Feeling Destructive?

THE PITTSBURGH Corning Corporation has available samples of its Foamglas insulation which it invites you to stand on, dunk in water, mutilate and otherwise maltreat. They enclose a small twelve-page leaflet telling how to torture the insulation.

The company has devised a series of tests to prove the physical qualities of the material and 2 x 4 x 6 inch samples of Foamglas cellular glass insulation are available.

Bulletin on Soundzorber

SOUNDZORBER, a wire-reinforced rubber pipe for eliminating noise and vibration from water lines, is described in a catalog issued by T. R. Finn & Company, Inc. Sizes range from ½ to 12 in.

The catalog gives detailed descriptions of their construction. These include the smooth inner lining of high-tension abrasion-resisting rubber, the pipe walls of rubber impregnated wire-reinforced fabric imbedded in rubber for their full length, and outer wall coverings of abrasion, sun and weather-resisting rubber. Small pipes are equipped with male iron pipe thread fittings. Large sizes have integral full-faced rubber flanges backed with either 150- or 300-pound drilling steel flanges also imbedded in rubber.

Condenser Bulletin

NIAGARA BLOWER Company Bulletin No. 131, "Sectional Aeropass Condenser", four pages, shows benefits of new, sectional-design refrigeration condensers for 100 to 240 tons refrigeration capacity and explains their functions with diagrams and installation photographs. The manufacturer is the Niagara Blower Company, 405 Lexington Ave., New York 17, N. Y.

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Classified Advertising

All classified advertisements are payable in advance. RATES: 20c per word; minimum 25 words. $2.00 Except for Positions and Help Wanted classifications, per line for bold face headings; $15.00 per inch for this section is reserved exclusively for USED equipment. line listings.

Positions and Help Wanted

REFRIGERATION SALES ENGINEERS—Eastern manufacturer planning to open sales office in San Francisco requires qualified sales and application engineer and one junior assistant ambitious for training and promotion. Reply to Box MY-2, c/o Industrial Refrigeration.

USED EQUIPMENT—wanted & for sale

FOR SALE—Late model Baker compressor with 75 h.p. motor. Must move shortly, so make us an offer. Address Box MY-4 c/o Industrial Refrigeration.

FOR SALE— 3 Baker compressors, 5 h.p., 15 h.p., 25 h.p. Rapid Standard conveyor, 54' and 34' x 16". Clark electric lift. 1 ton with generator. New door 2'-6" x 3' x 6". Write Hughes Plastics, 721 Pleasant St., St. Joseph, Mich.

FOR SALE—4x4, 5x5 Fricks. 5x5, 8x8 Yorks. 4 cylinder York Freon compressor.Two 10x10 Fricks. Two 8½ Vilters. Write E. Niebling, 1546 St. Clair, Mt. Healthy, Cincinnati 31, Ohio.

FINNED PIPE FOR SALE—61 lengths 12' each. Made from 2" steel pipe-7" square fins 1½" apart; galvanized. New at only $3.00 per foot. Also 100 steel Hand Trucks. Medium duty; roller bearing wheels. New at $6.00 each. West Side Cold Storage Co., 7 Harrison St., New York 13, N.Y.

FOR SALE

2—10x10 Fricks with syn. motors, panels. exciters, motor generator sets and all accessories; excellent condition.
1—10x10 York with V belt wheel.
1—8x8 Frick with synchronous motor, panels exciter and all accessories.
1—8x8 Voss with V belt wheel.
2—7½x7½ Yorks—one with V belt wheel, one with or without steam engine.
1—6x6 York with V belt wheel.
900—Ice cans, 11"x22"x51"

CONNECTICUT ICE MACHINE CO., INC.
7 Madison St. South Norwalk, Conn.

FOR SALE — 8 x 8, Y 30, high speed York ammonia compressor complete with grooved fly wheel and V-belts, also several used motors from 3 to 10 h.p., and a 60 h.p. D.C. The Gus A. Regnier Refrig. Engineering Co., 532 Winchester Ave., P.O. Box 1093, New Haven, Conn.

CHR. HEURICH BREWERY — WASHINGTON CLOSES ITS DOORS

Announces immediate sale all machinery, including 4 York vertical shell and tube condensers, new 1946, ASME stamped; 2 horizontal welded steel ammonia receivers; York 3x3 ammonia compressor; I.P. Morris & DeLavergne 6 cylinder Diesel motor compressor unit connected on a straight 6 cylinder Diesel crankshaft with 2 ammonia compressor cylinders 11½" x 18" stroke; also drives General Electric continuous current generator; thousands of feet and tons of 2" galvanized ammonia pipe, fittings and accessories; conveyors, etc. Inspection invited. Offered subject prior sale. Contact

CHR. HEURICH BREWERY
26th & D Sts. Phone RE 1600, Washington, D.C.

USED EQUIPMENT—continued

FOR SALE-COMPLETE ICE MAKING PLANTS
624 can York — 6 can pull
624 can Frick — 6 can pull
268 can Frick — 4 can pull Diesel operated.
9x9 York V-belt drive 75 h.p. motor.
8x8 York 75 h.p. synchronous motor.
7½x7½ York V-belt drive 50 h.p. motor.
4x4 York — 2 h.p. ice breaker
Condensers-Ice Cans-etc.

JOHN F. CARSON
"A" & Venango Sts. Philadelphia 34, Pa.
GArfield 6-2221

WANTED—100 good four hundred pound ice cans, size 11½x22½x58. Must be good. Mountain Ice & Coal Co., P.O. Box 1457, Pueblo, Colo.

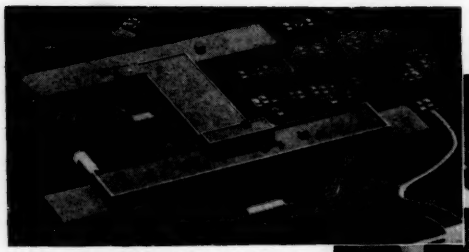
FOR SALE — Refrigeration equipment; ice equipment; new, used. Advise us your needs. Use "QUICKSEAL" — stops brine tank leaks; easy, efficient, economical. Born Company, 80 East Jackson Boulevard, Chicago 4, Illinois, WAbash 2-3299.

FOR SALE—241 four hundred pound ice cans size 11x 22x62, used three seasons. Galvanizing like new. Mountain Ice & Coal Co., P.O. Box 1457, Pueblo, Colo.

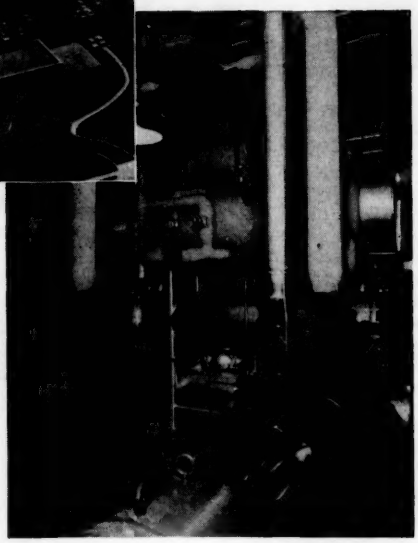
FOR SALE

1 — 12"x12" 4 cyl. late Frick compressor.
1 — 11"x13" 2 cyl. York direct conn. syn. motor.
3 — 10"x10" 2 cyl. York direct conn. syn. motor.
2 — 9"x9" — 2 cyl. York direct conn. syn. motor.
1 — 7"x7" — 2 cyl. Frick direct conn. syn. motor.
1 — 7½"x7½" 2 cyl. York V. flywheel comp.
1 — 6"x6" — 2 cyl. Frick flat flywheel comp.
1 — 5"x5" — 2 cyl. Frick V. flywheel compressor.
3 — 9¼"x14" 115 h.p. Wolverine Diesel engine.
1 — 8 ton Niagara Evap. condenser.
11x22x47" and 11x22x51" ice cans.
Ice Plants — 20 to 100 tons.

ENTERPRISE EQUIPMENT CORPORATION
77 Alexander St. Yonkers, N.Y.
Cable: ENEQCO Phone: Yonkers 8-8118



Midwest Research Institute, Kansas City, Missouri equipped with a Vilter central station air-conditioning system.



Two Vilter 6-cylinder VMC Freon-12 compressors, and a Vilter shell and tube cooler.

Q. *Why is Vilter Air Conditioning so well accepted in the Building Industry?*

A. because Vilter equipment lasts longer—and

costs less to own*

Vilter performance starts with a soundly engineered system designed to your specific needs, careful installation, and on-the-job testing.

Note how carefully this Midwest Research Institute job was laid out: The installation consists of two Vilter 6-cylinder VMC Freon-12 compressors, direct-connected to two 60 hp, 1160 rpm motors. Each compressor has a capacity of 60 tons, making a total of 120 tons when cooling 360 gpm of chill water from 52° to 44°. The Vilter shell and tube flooded cooler is mounted on a stand in conjunction with the Freon condenser, liquid receiver, and heat exchanger. Each compressor is operated at ⅓, ⅔, or full capacity as the load requires . . . the system is completely automatic through the six-stage step controller . . . equipped with complete safety control system.

This system has operated entirely satisfactorily and the owners are well pleased. Call your Vilter representative about your problem.

Equipment furnished by O'Dower Engineering Co., Kansas City; Installed by A. D. Jacobson Plumbing and Heating Co., Kansas City; Designed by: Howarth, Scott and Kinney, mechanical engineers.

* Savings in low first cost are not the complete answer when considering the installation of refrigeration equipment. But savings in terms of years of extra service, reliable performance and minimum maintenance—that's where Vilter excels in low-cost ownership.

QUALITY CRAFTSMANSHIP that lasts...

ENGINEERING DESIGN that guarantees performance

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Air Units • Ammonia & Freon Compressors • Booster Compressors • Baudelot Coolers • Water & Brine Coolers • Blast Freezers • Evaporative & Shell & Tube Condensers • Pipe Coils • Valves & Fittings • Pakice & Polarflake Ice Machines

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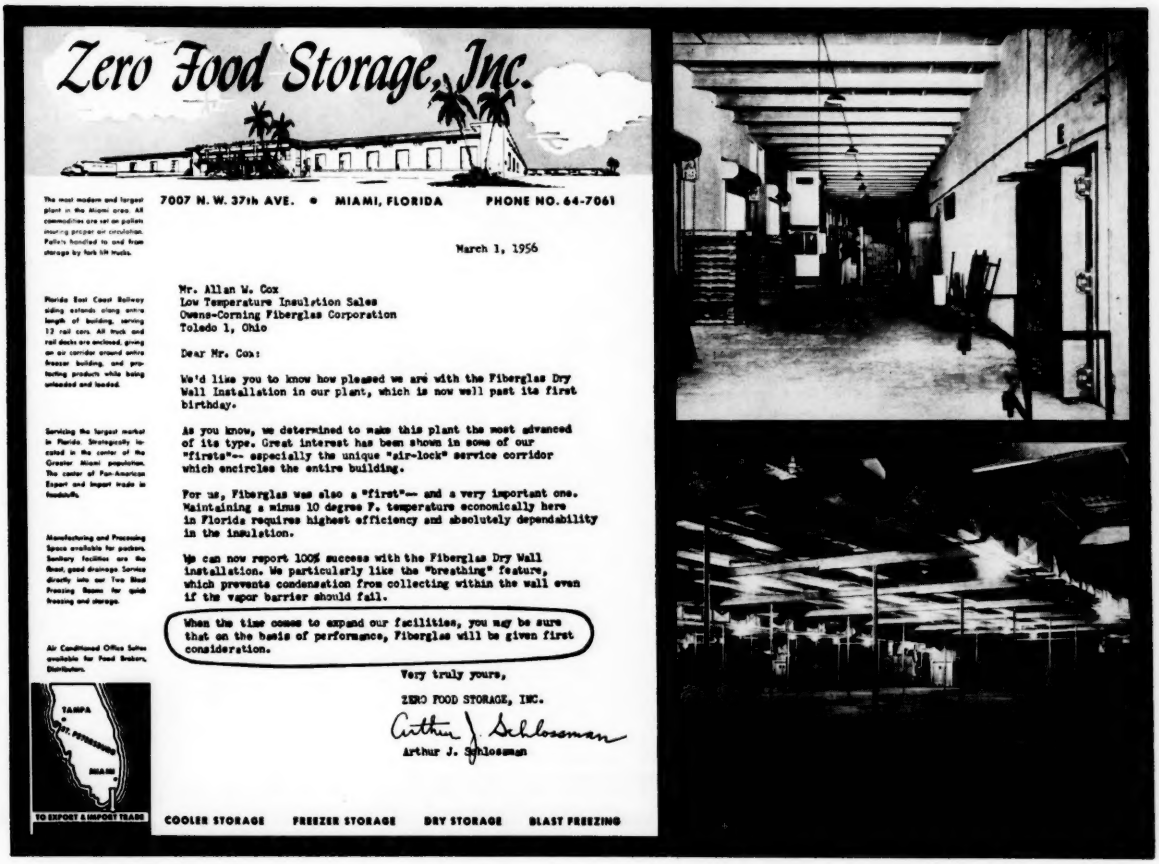
FIBERGLAS PF Dry Wall Installation scores "100% success" for pace-setting sub-tropical freezer/storage design

—TESTIFIES ARTHUR J. SCHLOSSMAN OF MIAMI'S ZERO FOOD STORAGE, INC.



Zero Food Storage, Inc.

7007 N. W. 37th AVE. • MIAMI, FLORIDA PHONE NO. 64-7061

March 1, 1956

Mr. Allan W. Cox
Low Temperature Insulation Sales
Owens-Corning Fiberglas Corporation
Toledo 1, Ohio

Dear Mr. Cox:

We'd like you to know how pleased we are with the Fiberglas Dry Wall Installation in our plant, which is now well past its first birthday.

As you know, we determined to make this plant the most advanced of its type. Great interest has been shown in some of our "firsts"— especially the unique "air-lock" service corridor which encircles the entire building.

For us, Fiberglas was also a "first"— and a very important one. Maintaining a minus 10 degree F. temperature economically here in Florida requires highest efficiency and absolutely dependability in the insulation.

We can now report 100% success with the Fiberglas Dry Wall installation. We particularly like the "breathing" feature, which prevents condensation from collecting within the wall even if the vapor barrier should fail.

When the time comes to expand our facilities, you may be sure that on the basis of performance, Fiberglas will be given first consideration.

Very truly yours,
ZERO FOOD STORAGE, INC.
Arthur J. Schlossman
Arthur J. Schlossman

TAMPA
ST. PETERSBURG
MIAMI
TO EXPORT & IMPORT TRADE

COOLER STORAGE FREEZER STORAGE DRY STORAGE BLAST FREEZING

Mr. Schlossman's first experience with the superior performance of economical Fiberglas* Low Temperature Insulations led to a great big Fiberglas candle on Zero Food Storage's first birthday cake! "Maintaining a minus 10 degree F. temperature economically here in Florida," writes Mr. Schlossman, "requires highest efficiency and absolute dependability in the insulation...We can now report 100% success with the Fiberglas Dry Wall installation."

The revolutionary layout of Zero's Miami plant created a tough insulation problem. The unique "air-lock" service corridor encircling the building has *sixteen* service doors opening to outside Florida air. But Fiberglas Insulation protects the 621,308-cu. ft. freezing/storage area with top efficiency . . . another striking example of Fiberglas' *unbeatable* combination of insulation advantages for every type of cold storage installation.

Ready to specify insulation for *your* low temperature structure or equipment? You'll want to compare proven-superior Fiberglas Insulations with any other material. Get all the facts now—MAIL COUPON TODAY!

It's amazing the difference Fiberglas makes!

OWENS-CORNING FIBERGLAS

*T-M. (Reg. U. S. Pat. Off.) O-C. F. Corp.

Owens-Corning Fiberglas Corporation
Dept. 165-E, Toledo, Ohio

Please send me free the booklets I have checked:

- ☐ *Insulation for Low Temperature Structures and Equipment*
- ☐ *PF Design Details*
- ☐ *Why the Trend is to Fiberglas*

Name and Title _____

Company _____

Address _____

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ANHYDROUS AMMONIA

99.99% pure Ammonia

Every cylinder cleaned and inspected

A standard in the refrigeration industry for 75 years

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ALWAYS UNIFORM

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